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ABSTRACT

Assessment in higher education is addressed in these proceedings of the 1987 conference of the North East Association for Institutional Research. Papers and authors include: "Assessing the Status of Assessment" (Peter T. Ewell); "Has the Middle Class Been Pressured the Most? Multivariate Analysis of Parental Contributions to Higher Education" (Yuko M. Mulugetta, Donald Saleh); "Using Telephone Surveys of Students to Gather Sensitive Data about Controversial Topics" (Quint Thurman, William Weitzer, Kathryn Franklin); "The Content Analysis of Media Coverage" (Thomas Wickenden); "Creating an Assessment Plan for a Developmental Studies Unit" (Elizabeth Taylor); "Student Retention at a Non-Residential University" (Peter Langer); "A Comprehensive Multidimensional Approach to Outcomes Research" (Angela Zawacki); "Relationships of Institutional Characteristics to High, Middle, and Low Levels of Voluntary Support" (Margaret Duronio, Bruce Loessin, Georgina Borton); "Knowledge Based Systems in Institutional Research" (Laurie Webster-Saft); "Cornell's Academic Personnel Database" (Catherine Benedict); "Collective College Reports System" (Susan Juba, Peter Toro); "System Dynamics Modeling with STELLA: Minority Recruitment and Retention in a College Setting" (Wendy Graham); "Developing a School Planning and Institutional Research Office within a Complex University" (Karen Liselis); and "Planning for Student Enrollments, Budget, and Faculty Workload: The Interface of Financial and Academic Policy in a Large College" (Jay Halfond). (SW)

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North
East
Association for
Institutional
Research

14th Annual Conference

# ASSESSMENT:
# FAD OR FACT OF LIFE?

**PROCEEDINGS**

The Marriott Thruway Hotel
Rochester, New York

October 25 - 27, 1987

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# ASSESSMENT:
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**PROCEEDINGS**

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# FOREWORD

The 1987 annual conference of the North East Association for Institutional Research was a marked success, setting new standards in content, hospitality, and attendance.

President G. Dennis O'Brien of the University of Rochester welcomed the attendees at the opening banquet with a thoughtful and witty review of changes in higher education in general and at U. of R. in particular.

Departing from the complete dependence in prior years on contributed papers and volunteered panel discussions, Program Chair Jennifer Presley focussed the conference on the theme of assessment. She chaired a full morning's presentation on this theme, featuring Peter Ewell's keynote address and papers on statewide accountability, program evaluation, and student evaluation, by Lewis Dars, E. Thomas Moran, and Robert Grose. The assessment theme, a relatively new topic for institutions in the northeast but one that is rapidly growing in importance, was then picked up throughout the balance of the conference in papers and discussions.

Conference attendance reached 278, surpassing by 38 the already high level attained by the Philadelphia conference. Larry W. Metzger chaired the Local Arrangements committee, and was ably assisted by others from his office and by John Whitely and colleagues from Rochester-area institutions. While the conferees enjoyed the ease of conference registration, the evening at Rochester Institute of Technology, and the hospitality of the Marriott Thruway Motel staff, they could only guess at the major logistical support required for an event of this magnitude.

During the year, Vice-President Paige V. Ireland laid plans for next year's activities. As Treasurer, Peter T. Farago ably managed the accounts for the Association, improving the reporting formats so that the results could be better used for modelling the financial future. Secretary Jill F. Campbell "kept the cards and letters coming" as well as maintaining and updating the membership database. Proceedings were published for both the 1985 and 1986 conferences, and work on an initial publication in the Institutional Research Information Series proceeded toward a printing early in 1988. Bayard Baylis chaired the Publications committee.

The reward for outstanding performance in NEAIR turns out to be that of being asked to do yet more. Having managed the annual conference program, Jennifer Presley was willing to take on the task of publishing the Proceedings, keeping them at the same high level of quality. For that double duty, a special vote of thanks!

As an association, NEAIR has sought to be a hospitable and supportive location for "first presentation" and "first publication" by the members. That tradition continues. The importance of openness and friendliness is not, however, inconsistent with an attention to quality and timeliness.

With these acknowledgements, and many others to the other members of the Steering Committee and to the members of NEAIR, I commend to the membership these Proceedings.

John A. Dunn, Jr.
President, NEAIR 1986-87

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| | | Richard Rugen | Kutztown University |
| | | Susan Shaman | U. Pennsylvania |
| Immediate Past President: | | John A. Dunn, Jr | Tufts University |

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NEAIR 1987 ANNUAL CONFERENCE PROGRAM

NOTE: *** means that the paper is included in these Proceedings.

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Sunday, October 25

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11:15 AM - 12:30 PM  President's Brunch

Steering committee, conference workers, and workshop presenters.

12:00 Noon - 5:00 PM  Registration

12:30 - 3:30 PM  PRE-CONFERENCE WORKSHOPS

Pre-registration required. Workshops are formal professional development training sessions conducted by leaders in the field. The $20 fee includes the cost of materials.

Newcomers to Institutional Research

Michael F.Middaugh, Assistant to the President for Institutional Research and Strategic Planning, University of Delaware

This workshop is designed to give new practitioners in the field of institutional research a hands on approach to getting started in the field. Using a carefully designed manual of instructional materials, workshop participants will walk through a series of exercises designed to address such issues as: how to ensure data integrity; developing factbooks and reports that are read and used by college presidents; defining critical issues for institutional research at your college or university; identifying sources of data; conducting survey research; using personal computers and commercial software in institutional research and strategic planning; developing forecasting models. The workshop will also address the political pitfalls in institutional research, and will discuss how the new practitioner can effectively link his/her office with the strategic planning/decision making center at their institution.

Measuring Student Retention: A Vital Part of Outcomes Assessment

Timothy R. Sanford, University of North Carolina-Chapel Hill

This workshop is designed to help institutional researchers build on or improve a student retention data system. It aims to help participants conceptualize the relationship between designing a student retention system and obtaining useful information from the system. The workshop will include sessions on implementing a campus retention effort; building a retention file; selecting data items; and studying special student populations such as minority groups, athletes, transfer students, and graduate students.

NOTES:

WORKSHARES are informal discussions and sharing of work in progress. Participants are encouraged to share insights and/or samples of work at the workshare session. Pre-registration is NOT required.

FACTBOOKS. Please bring copies of your institutional Fact Book for display at the conference. A separate table for this purpose will be available in the registration area.

EMPLOYMENT OPPORTUNITIES. Openings are posted on the bulletin board in the registration area. In at least one case, a representative of the institution is enrolled at the conference, and will be available for discussion. Please check the bulletin board for more details.

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Sunday Afternoon
3:45 - 5:00 PM CONTRIBUTED SESSIONS

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TRACK IA Institutional Research in Practice
Moderator: Dawn Terkla, Tufts University

3:45-5:00 PM PAYING FOR COLLEGE

Student Indebtedness and Gender: One Year After Graduation
Jennifer Brown, Connecticut State University

An examination of student indebtedness, particularly a comparison of results by gender of a survey of the Class of 1986 of a four campus state university system. Students were asked about their financial aid experience and the impact of indebtedness on their life decisions.

*** Has the Middle Class Been Pressured the Most? Multivariate Analysis of Parental Contributions to Higher Education
Yuko Mulugetta and Donald Saleh, Cornell University

Cornell University conducted research on parental contributions of dependent financial aid students in 1983 and 1986. Findings indicate that parental contributions have significantly increased in general and for the $40K-$50K income group in particular.

Are Enrollments in the Mid-1980's More Affected by Financial Aid Packages Than in the Early 1980's?
Elizabeth S. Johnson, Massachusetts Institute of Technology

A recent study of admits to a large northeastern higher education institution resulted in a greater than 80% response rate by both enrolling and non-enrolling students. The results suggest the growing importance of financial aid packaging, particularly that of merit aid in attracting students away from an institution.

Sunday Afternoon Continued

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TRACK IB Institutional Research in Practice

4:00-5:00 PM
WORKSHARE: Counting Faculty FTE.
Convener: Paige Ireland, Cornell University.

This Workshare provides an opportunity to discuss how to calculate full-time equivalents. It will cover such issues as data collection for workload analysis and how to relate part-time faculty to FTEs.

TRACK II Methods and Models
Moderator: Marian Steinberg, Connecticut State Technical Colleges

3:45-4:30 PM
*** Using Telephone Surveys of Students to Gather Sensitive Data about Controversial Topics
Kathryn Franklin and Quint Thurman, University of Massachusetts-Amherst

Telephone surveys are one method the University of Massachusetts uses to gather timely data from students. The data described here suggest how data on sensitive topics (for example, contraceptive practices, AIDS, and racism) might be measured for survey research. The quality of these data and their applicability to policy-makers are discussed.

4:30-5:00 PM
*** The Content Analysis of Media Coverage
Thomas Wickenden, Tompkins Cortland Community College

Articles about Tompkins Cortland Community College appearing in local newspapers over the last 5 years were analyzed to determine levels and changes in positive, negative and neutral coverage of various topic areas. This presentation describes the content analysis methodology. The results can be used to track the media image of the College and to evaluate the effectiveness of PR efforts.

TRACK III Management of Institutional Research

4:00-5:00 PM
PRESENTATION/WORKSHARE: Getting Research Used
Margaret A. Duronio, University of Pittsburgh

This session presents the perspective that "less-than-ideal" research utilization and acceptance of research results are inevitable consequences of organizational dynamics. Interpersonal skills for enhancing utilization and acceptance will be discussed, as well as personal skills for enhancing health/longevity of institutional researchers. Participants will be invited to relate personal methods for coping.

Sunday Evening

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5:15 - 6:30 PM — Social Hour

6:30 - 8:30 PM — Dinner and Welcoming Address
Dennis O'Brien, President,
University of Rochester

8:30 PM onwards — Dancing and Networking in "Charades" Bar

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Monday, October 26

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7:30-8:30 AM — COMPLEMENTARY COFFEE AND DANISH

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7:30-8:30 AM — SPECIAL INTEREST GROUPS:

The Higher Education Data Sharing (HEDS) Project
Convener: John Dunn, Jr., Tufts University

SUNY AIRPO
Convener: Jill Campbell, SUNY at Brockport

Two-Year Institutions
Convener: Webster Trammell, Brookdale Community College

Pennsylvania SSHE Research Directors
Convener: Tom Gusler, Clarion University

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8.00-11.30 AM — REGISTRATION CONTINUED

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8:45 AM-11:45 AM — GENERAL SESSION

Assessing the Status of the Assessment Movement

Moderator: Jennifer B. Presley, University of Massachusetts, Boston

8:45-9:30 AM *** Keynote Address
Peter Ewell, Senior Associate, NCHEMS

9:40-10:50 AM — Panel Presentation

Assessment as Statewide Accountability: New Jersey.
Lewis Dars, Massachusetts Board of Regents

Assessment as Program Evaluation.
E.Thomas Moran, SUNY-Plattsburgh

Assessment as Student Evaluation: The Harvard Project
Robert Grose, Amherst College

Monday Afternoon

| | |
|---|---|
| 12:00-1:15 PM | LUNCH, including<br>Annual Business Meeting |
| 1:30-4:30 PM | CONTRIBUTED SESSIONS |

TRACK IA Institutional Research in Practice
Moderator: Jennifer Brown,
Connecticut State University

1:30-3:00 PM RETENTION/OUTCOMES

*** Creating an Assessment Plan for a Developmental Studies Unit
Elizabeth Taylor, Schenectady County Community College

The creation of an assessment plan for a specific program or unit within a community college is described. The effect of this effort on the way retention information is defined, and the way information about all students is maintained and coordinated, will also be discussed.

*** Student Retention at a Non-Residential University
Peter Langer, University of Massachusetts-Boston

Most retention studies have been conducted in residential colleges with traditional age populations. This paper reports a longitudinal study of retention at a non-residential 4-year public university with sizable numbers of minority and older students.

*** A Comprehensive Multidimensional Approach to Outcomes Research
Angela Zawacki, Linda Graham, and Janet Hall, University of Delaware

Student outcomes assessment utilizes a wealth of data for examining the University of Delaware's "successes" and "failures". Longitudinal enrollment and persistence patterns of multiple student cohorts provide a basis for establishing categories of dropouts and persisters. This presentation will discuss creative survey techniques employed to complement information gathered from the computerized Student Records data base in evaluating outcomes and the dimension of value added.

TRACK IB Institutional Research in Practice
Moderator: G. Jeffry Paton, University of Rochester

2:00-3:00 PM FUNDRAISING

Understanding and Predicting Alumni Giving Behavior
Michael S. Connolly, Wesleyan University

Theoretically, alumni giving behavior is a function of capacity and motivation. To test this theory, capacity and motivational measures were analyzed by multivariate statistical procedures. The results indicate with high statistical significance that alumni giving behavior is predicted by both sets of measures. In addition to predicting the giving behavior of individual alumni, this model should be of value in helping Development officers form fundraising strategies.

Monday afternoon Continued

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TRACK IB 2.00-3.00 PM Continued

*** Relationships of Institutional Characteristics to High, Middle and Low Levels of Voluntary Support
Bruce A. Loessin, Margaret A. Duronio, and Georgina L. Borton, University of Pittsburgh

This session will be based on profiles of institutional characteristics for institutions with high, middle, and low outcomes in total voluntary support and in gifts from four major donor groups. Implications for fundraising practice, planning, evaluation, and interinstitutional comparisons will be discussed.

TRACK II Methods and Models
Moderator: Jennifer Wilton,
University of Massachusetts,Boston

1:30-2:00 PM
*** Knowledge Base Systems in Institutional Research
Laurie Webster-Saft, SUNY-Albany

The field of Artificial Intelligence has reached the point of development where it might be a worthwhile tool for Institutional Research. This presentation introduces Artificial Intelligence/ Knowledge Base systems (referred to as AI/KB systems) and considers how this tool can be used for IR applications.

2:00-3:00 PM
*** Cornell's Academic Personnel Database (Demonstration)
Catherine L. Benedict, Cornell University

A discussion of the University on-line Academic Personnel Database developed by Cornell to capture and analyze Human Resource data in a systematic and timely fashion. Executive policy makers are requiring interpretation of trends while individual units within the University raise new questions about data control and dissemination.

TRACK III Management of Institutional Research

1:30-3:00 PM
PANEL: The Small I.R. Office: Is Less More?
Moderator: Jocelyn Clark, University of Maryland - University College
Robert Gell, Cecil Community College
Kathleen Gemell, Cornell University
Marie Glanville, Shippenburg University
F. Robert Grose, Amherst College

This presentation focuses on the I.R. Generalist. These professionals practice institutional research at either a small institution or apart from the designated I.R. operation and must change hats, depending on the occasion, to play many roles for many constituencies. The panel will discuss the nature and role of the small I.R. office and will debate the issue of whether its peculiar character enhances or inhibits the work of the institutional researcher.

Monday Afternoon Continued

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|---|---|
| 3:00 - 3:15 PM | Refreshment Break |
| 3:15-4:30 PM | CONTRIBUTED SESSIONS CONTINUED |

TRACK IA Institutional Research in Practice

3:15-4:30 PM

PANEL: Evaluating Teaching for Promotion and Tenure Decision Making
John D. Centra, Robert M. Diamond, and Robert C. Froh, Syracuse University

This session will provide both a planning model and a variety of tools for conducting an assessment of teaching performance primarily for the needs of making promotion, tenure, or salary decisions. A guidebook will be described that is designed to assist faculty and administrators in assessing effective teaching.

TRACK IB Institutional Research in Practice

3:15-4:00 PM

WORKSHARE: Recruiting and Retaining Minority Students at Colleges and Universities in the Northeast
Convener: Michael F. Middaugh, University of Delaware

Successful recruitment and retention of minority students, particularly blacks, is becoming increasingly difficult in light of shrinking applicant pools and declining participation rates for minority students. The University of Delaware has had to confront these problems over the past decade as part of a compliance plan under which the State of Delaware worked with the U.S. Office of Civil Rights to increase minority enrollments at the University. The purpose of this Workshare is interaction with other institutions with similar problems, presenting the opportunity to share those programs and policies that work, and to benefit from each other's mistakes.

TRACK II Methods and Models
Moderator: Jill Campbell, SUNY College, Brockport

3:15-4:00 PM

*** Collective College Reports System (CCRS) (Demonstration)
Susan Juba and Peter Toro, Brookdale Community College

Imagine being able to computerize all of your research reports by name, type of analysis, report type, location, and major keywords. If you have an IBM or 100% compatible computer, you can do so. This presentation will feature the Collective College Reports System that was developed by the Research and Development Office at Brookdale Community College. The flexibility of the system for single and multi-campuses will be observed, as the presentation provides a completely menu-driven, screen-by-screen view of the system and how it works.

Monday Afternoon Continued

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TRACK II Continued

4:00-4:30 M

*** Evaluating Policy Options for Increasing Minority Enrollments using Systems Dynamics Methodology (Software Application Presentation)
Wendy F. Graham, Cornell University

Policy options for increasing recruitment and retention of minority students should include estimates of the long-term effects of current decisions. This task requires simulation of complex interactive processes which can be difficult for non-technical staff to understand and manipulate. A user-friendly program, STELLA, that performs systems dynamics simulation, is presented as a means of modeling the minority recruitment and retention process.

TRACK III Management of Institutional Research
Moderator: Peter Farago, Bentley College

3:15-4:30 PM IR WITHIN SCHOOLS/COLLEGES

*** Developing a School Planning and Institutional Research Office within a Complex University
Karen L. Miselis, University of Pennsylvania

In a large, complex institution, planning and analysis must take place at several levels to be effective. This paper describes the process of designing and developing an office of planning and analysis in the School of Arts and Sciences at the University of Pennsylvania, with relevant comparisons to other large institutions.

*** Planning for Student Enrollments, Budget, and Faculty workload - the Interface of Financial and Academic Policy in a Large College
Jay A. Halfond, Northeastern University

An example of how a large business college integrates enrollment projections, budgeting, and faculty recruiting in anattempt to anticipate and provide for student and faculty needs. This college will now be implementing a teaching load reduction by systematically increasing class size. The advantages and pitfalls of academic planning will be discussed.

TRACK IV Policy Issues

4:00-4:30 PM

*** Are There Tuition Constraints in Your Future? Retrospective Analysis as a Guide to Consequences
John A. Dunn, Jr., Tufts University

From 1950 through 1980, student charges at most private institutions rose in pace with family incomes; since 1980 they have risen considerably faster. Speculating that this cannot continue, one private university examined what happened to its incremental real revenue as a guide to what might not be possible in the future.

Monday Evening

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4:30 PM Wine and Cheese hosted by Mariott Thruway Hotel.

5.30 PM Buses Depart for Fall Festival Celebration

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Tuesday, October 27

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8:30-11:45 AM CONTRIBUTED SESSIONS

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TRACK IA Institutional Research in Practice

Moderator: Peter Langer,
University of Massachusetts, Boston

8:30-9:30 AM GENERAL EDUCATION ASSESSMENT

*** A Sector-Wide Community College Study to Assess General Education Outcomes
Arnold Gelfman, Brookdale Community College

This presentation will feature a discussion of a unique sector-wide college study designed to evaluate the ability of the ACT/COMP to measure general education growth.

*** The Effects of Core Curriculum on the Development of General Education Skills: Liberal Arts Claims Tested
Donald L. Coan and Richard Nigro, Neumann College

The effects of core curriculum on general education skills as measured by the ACT/COMP Objective Test are examined. The claims of liberal arts curriculum in fostering general analytic and communications skills are tested and challenged in view of the potential value of pre-professional curriculum to general education.

9:30-10:00 AM

*** Academic Difficulty: Examining all the Factors
Dawn Geronimo Terkla and Ronald E. Walton, Tufts University

This presentation examines those factors that contributed to the academic difficulty of freshmen during the 1985-1986 and 1986-1987 academic years. Differences are examined between the academic difficulty group and a matched control group.

TRACK IB Institutional Research in Practice

8:30-10:00 AM

Sunday Newcomers Workshop Follow-Up. Pre-registration required.

Tuesday Morning Continued

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TRACK IIA Methods and Models

8:30-9:30 AM
WORKSHARE: Questionnaire Design
Convener: Linda A. Suskie, University of Pennsylvania-Millersville

Questionnaire survey research: What works for the institutional researcher? Participants are invited to share stories and examples of questionnaires that have garnered high response rates and valid results. Bring copies of questionnaires that have worked for you...and maybe tales of your worst failure?

TRACK IIB Methods and Models Council

9:00-9:30 AM
*** Linking Community Assessment to the Strategic Planning Process
Robert Karp, North Country Community College

This paper will describe the methodology employed to conduct and link a community assessment study to a rural community college's strategic planning process. Emphasis will be placed on study objectives, questionnaire design and analysis, and the anticipated effects the outcomes will have on the institution's viability during a period of projected declining enrollments.

9:30-10:00 AM
*** The Integration of a Post-Graduation Activities Survey
Robert Cushing, Cornell University

A discussion focusing on the university versus college (or centralized versus decentralized) perspectives of integrating a post-graduate activities survey. Included will be a review of the methodology and the various data uses at a large university.

Tuesday Morning Continued

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TRACK III Management of Institutional Research
Moderator: Webster Trammell,
Brookdale Community College

9:30-10:00 AM

*** Multiproject Management Using the Harvard Total Project Manager
Thomas Wickenden, Tompkins Cortland Community College

Although they are designed to support single projects, software packages such as the Harvard Total Project Manager can be used to manage the multiple projects that typify an Institutional Research environment. The implications of this package for management of an institutional research unit are described in this presentation.

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10:00 - 10:15 AM Refreshment Break

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10:15 - 11:45 AM CONTRIBUTED SESSIONS CONTINUED

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TRACK IA Institutional Research in Practice
Moderator: Bayard Baylis, Messiah College

10:15-11:00 AM

The Cycles Surveys Revisited
Robert F. Grose, Amherst College

Since 1975 Amherst College - and others among the 5-College Consortium - has carried out an annual random sampling of student activity and opinion. The current paper will touch on factors such as sampling, changes through time, open-ended questions, cross-college comparisons, evaluation of student gains, and data analyses and uses.

11:00-11:30 AM

*** The Impact of College Experience on the Intellectual Growth of Transfer Students.
J.Fredricks Volkwein, SUNY Albany, Thomas Wright, Regents External Degree Program, Albany and Marios H. Agrotes, SUNY Albany.

This study used a LISREL model to examine the intellectual growth reported by transfer students from 2-year and 4-year colleges after one year of study at SUNY Albany. The presentation will display the results and discuss both theoretical and administrative implications.

Tuesday Morning Continued

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TRACK IB Institutional Research in Practice
Moderator: Ron Doernbach, Dickinson College

10:15-11:00 AM
Basic Skills Assessment and Placement of Incoming Students: A Research-Backed Implementation Design
Sherrill Ison and James Terrell, Monroe Community College

A four-year methodology with first-year results of a comprehensive approach to development of a community college testing and placement program will be discussed. Research elements include predictors of success, student/placement fit, faculty/student satisfaction, college image, and evaluation of improvement in retention and achievement.

11:00-11:45 AM
Sex Bias as a Product of Using the Scholastic Aptitude Test as a Tool in Making Admissions Decisions: A Case Study
Michael F. Middaugh and Dale W. Trusheim, University of Delaware

The extent to which use of the Scholastic Aptitude Test in making admissions decisions results in a bias against women in those decisions is the focus of this paper. Analysis of admissions decisions at a large public university over a two year period and involving over 25,000 applicants is the thrust of this study. The results tend to confirm the presence of a biasing factor, and the authors suggest strategies for offsetting bias. The paper also represents a viable vehicle through which offices of institutional research can enter the strategic planning arena.

TRACK II Methods and Models
Moderator: Susan Shaman, University of Pennsylvania

10:15-11:00 AM
Creating a Viable Computer Environment for Institutional Research
Jennifer Wilton, University of Massachusetts-Boston

A case study which demonstrates and offers advice on how a software system can be tailored to the needs of an institutional research office. Sophisticated, off-the-shelf software installed in several linked environments is used to unify the system and make the differing operating systems transparent to users.

11:00-11:45 AM
PANEL: Developing Quality of Life Surveys
Robert C. Froh and David B. White, Syracuse University

This session presents what has been learned from administering a quality of life survey over the past ten years to 8000 students living in residence halls at Syracuse University. Primary attention will be given to the use of focus groups, measurement analysis, and externally developed normative surveys to strengthen the quality of this effort.

Tuesday Morning Continued

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TRACK IV Policy Issues
Moderator: Lewis Dars, Massachusetts Board of Regents

10:15-11:00 AM

Outcomes Data as Measures of Internal Effectiveness in Institutions of Higher Education

E. Thomas Moran, SUNY-Plattsburgh

This presentation argues that the value added movement in higher education will contribute valuable and enduring innovations if it concentrates on intra- as opposed to inter-institutional evaluation. The primary factor responsible for this view is that instruments used to assess value added are inevitably imperfect. Their weaknesses (which will be discussed in the presentation) can produce highly misleading conclusions when making comparisons among different institutions. Therefore, the appropriate application of these instruments is in their ability to serve as a stimulus to institutional self-examination. In this regard, value added data can be useful in promoting enhanced institutional goal clarity, congruence among constituencies, internal communication, and engendering commitment and involvement of organizational members, particularly of students.

11:00-11:45 AM

*** What Will You be Doing in 1992? A Speculation on the Next Set of Issues and Their Effect on IR and Planning Offices

John A. Dunn, Jr., Tufts University

Institutional research and planning offices, like their parent institutions, are shaped by changes affecting the industry. A review of possible future changes suggests that those units that focus on development, marketing, cost-effectiveness and assessment will prosper in budget and staff but lose independence, whereas traditionally oriented offices may suffer cutbacks.

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11:45-12:30 PM Post-Conference Special Interest Group

Middle-States Association Institutions.
Convener: Stuart Rich, Georgetown University.

Discussion of accrediting agency annual institutional data survey.

1:00-4:00 PM

Special meeting of SUNY Community Colleges

KEYNOTE ADDRESS - NEAIR MEETING, ROCHESTER N.Y.

Peter T. Ewell - Senior Associate, NCHEMS

As you know, the issue of assessing student outcomes has become increasingly important over the past two or three years. While its salience in the Northeast has to date been somewhat less than in other parts of the country, all signs point to both accrediting bodies and state agencies in the region taking assessment seriously. At the same time, the relative lack of external pressure to assess in the Northeast allows some time to reflect upon the issue, and to debate which types of programs might be best for each institution. The topic of today's meeting is thus particularly timely.

In undertaking a general discussion of assessment, it is important to first remind ourselves that the activity is not new. There are numerous past examples of attempts to gather evidence about student learning and to use the results to improve instruction--and many of them can be found in the Northeast. For example, the pioneering 1928 Pennsylvania General College Study set both methodological and conceptual standards that compare favorably with today's state of the art. Together with the fact that college and university faculties "assess" student learning every day, there thus are some grounds to wonder what all the fuss is about. Nevertheless, there is much in the current assessment movement that is new. First, in contrast to most past

efforts, the primary stimulus for today's effort is external. Increasingly, it is not institutions that are initiating such efforts, but rather the states that pay for them, the accrediting organizations that certify them, and the industries and communities that must live with their products. This fact alone puts a distinctive stamp on the enterprise. Secondly, emerging assessment efforts are programmatic. That is, they are increasingly undertaken not as a series of "one-shot" data gathering efforts, but rather in the form of an integrated, ongoing research effort employing multiple methods, and centrally funded and coordinated. Both differences, as I will emphasize later, have profound implications for the role of institutional research.

To begin our discussions of assessment this morning, I will try to accomplish three things. First, I would like to briefly distinguish among several types of "assessment" that are often confused. As Joel Reed, the President of Alverno College, recently observed, the term "assessment" has become like "Kleenex"--a generic term equally applicable across a range of products. Distinguishing among its many varieties thus becomes a critical first step in designing any program. Secondly, I would like to briefly cover some of the major methods used in assessment, bearing in mind (a) that choices among methods must be made that are appropriate to each institution's mission and that avoid the common syndrome of "measuring everything that moves", (b) that multiple methods are best, and (c) that the classic institutional research assignment will generally include only a few of these methods. Finally, recognizing this last constraint, I would like to mention some of the emerging

roles that institutional researchers are playing in assessment programs as I have observed them across the country.

1. Some Distinctions Among Assessment Programs: One clear victim of assessment's recent success has been its precision of language. Thus a single set of terms is often used to describe quite different types of programs--a lesson underlined by the diversity of panel presentations to follow. One useful way of distinguishing among such programs is to consider their differences on two primary dimensions. A first dimension, basic purpose, distinguishes approaches primarily intended to provide summative judgements from those intended primarily to guide improvement. Generally, assessment intended to provide accountability or to credibly demonstrate effective performance will be of the former variety; those designed to promote change or to inform decisionmaking will be of the latter. Certainly some activities will straddle the line. Institutional accreditation, for example, is generally regarded as a guide to improvement by accreditors, but as a species of accountability by the institutions that are in fact subject to scrutiny. A second quite different dimension is the unit of analysis to be assessed. Assessment programs such as those at Alverno College and at Miami-Dade Community College, for example, have as their primary focus the individual student. Many others, while they collect data from individual students, treat these data in aggregate fashion to support investigations of curricula, programs, and entire institutions.

Combining these two simple dimensions can yield some quite different types of programs. For example, Florida's College Level Academic Skills Program is summative and concentrates on individual students. Currently, all students in Florida public institutions must successfully pass a common set of college-level skills examinations in reading, writing, and computation as a condition for advancement into the junior year. Several individual institutions have also adopted this "rising junior" testing approach to ensure that students enter upper-level coursework with the requisite skills. More common are programs of entry-level basic skills assessment for purposes of advisement, placement, and remediation. These are examples of programs whose unit of analysis is the individual student, but that are intended primarily to provide guidance for decisionmaking. Considerably more complex procedures used in instruction throughout the curriculum at such institutions as Alverno College and King's College (Wilkes-Barre, PA), or for ongoing advisement as at Miami-Dade Community College are also examples of this major program type.

Professional or special program accreditation provides an excellent example of assessment directed primarily toward summative judgement, with the unit of analysis being a particular program or curriculum. The use of nationally-normed examinations by Northeast Missouri State University to establish the credibility of its degrees provides a parallel example undertaken by an individual institution. Finally, there are numerous

examples at both the state and institutional levels of program-level approaches intended to inform curriculum instructional improvement. At the state level, New Jersey's comprehensive College Outcomes Evaluation Project (COEP) provides an excellent instance. At the institutional level, leading examples that emphasize program evaluation include the University of Tennessee, Knoxville, Kean College (NJ), James Madison University (VA), and of course SUNY at Plattsburgh.

Distinctions among assessment approaches may also be made on the basis of the perspective in terms of which evidence is marshalled and discussed. Traditionally, assessment is intended to provide information about program effectiveness from the point of view of institutions and their faculty. But other key constituencies in the instructional process may approach higher education with quite different intended outcomes in mind. Contrary to the institutional perspective, for example, many students may not consider degree completion to be important, and may simply want the courses necessary to acquire skills needed for a given job. Similarly, key "consumers" of higher education's products such as businesses, government agencies, and graduate schools, may have a quite different notion from that of faculty about what kinds of knowledge and skill are important. As a result, institutions that are particularly sensitive to such constituencies are designing assessment programs that reflect these diverse points of view. For example, the Community College of Philadelphia and Mt. Hood Community College (OR) routinely collect student

goal information at registration, and track the degree to which student goals are in fact fulfilled as students progress.

2. Methods and Techniques of Assessment: In a presentation of this kind there is naturally insufficient time to cover in detail the many methods used in assessment. Nevertheless, I will attempt to (a) note some emerging methodological trends that I have observed in institutional assessment over the past few years, and (b) briefly describe the major "families" of method that generally find their way into integrated institutional assessment programs.

Observing developments at many institutions, it is possible to describe three major tendencies regarding assessment method. First, the coverage of assessment is changing. Once primarily the province of basic skills such as reading, writing, and computation, the action in assessment is now shifting to much more complex attributes and abilities--among them problem-solving, critical thinking, and valuing. Largely because of this shift, there has been a concomitant movement away from strictly quantitative standardized tests--particularly those such as the ACT Assessment and GRE, that were originally intended for quite different purposes. A proposed common general education instrument to assess such "higher-order" skills as part of New Jersey's COEP program, for example, will present students with a series of tasks to be performed, rather than with traditional multiple-choice questions.

Secondly, what might be termed the "model of student development" used to guide investigation has shifted from a crude "production process" analogy that views students as "inputs" to be operated upon by instruction, to a picture that is considerably more multi-causal and sophisticated. As a result, straightforward "value-added" testing approaches that rely largely upon the administration and re-administration of a single (generally standardized) assessment instrument are being modified to reflect several other factors. One is data about the actual instructional experience. Too often, institutions are finding, an outcome measure alone provides little or no guidance as to what can be beneficially changed, because there is limited ability to discriminate among vastly different student patterns of course-taking and levels of involvement. As a result, an important component of many assessment programs is a student tracking system intended to collect data about the kinds and levels of instructional (and co-curricular) experiences that students encounter. Also increasingly prominent are devices such as Pace's College Student Experience Questionnaire (CSEQ) designed to tap student "quality of effort", and to document student levels of involvement with their campus environments.

Finally, the actual data gathering methods predominantly employed in assessment are becoming more sophisticated and more integrative. "Second-generation" curriculum evaluation instruments such as the ETS Academic

Profile and ACT's "fourteenth year" assessment currently under development should be widely available by next year, and should prove a useful supplement to the now heavily-utilized ACT-COMP. At the same time, institutions are becoming a great deal more clever about the use of existing "points of contact" with students in order to gather more and better data. Among the most underutilized such "points of contact" are student course evaluation forms that might be modified to include a few common self-reported outcomes items, and existing single-purpose student survey forms that might be redesigned to encompass a wider set of outcomes.

In general, it is possible to identify four distinct "families" of methods that are used to generate assessment information. Comprehensive institutional programs will generally involve at least two or three of them. A first is standardized cognitive testing, using such instruments as the ACT Assessment, the ACT-COMP, Graduate Record Field Examinations, CLEP examinations, and a range of professional licensing, certification, or aptitude examinations. Joining this array, as noted previously, are such "second generation" higher-order skills tests as the ETS Academic Profile and the ACT "Fourteenth Year" skills assessment. Advantages of such standardized tests are many and include precision, external credibility, relative ease of administration and scoring, and the opportunity to compare results among peer institutions. Major disadvantages are also apparent, however. Foremost among them are the

"image" of standardized tests as being unable to effectively tap complex curricular outcomes, and the lack of correspondence between the coverage of most generic examinations and actual curriculum content at any given institution. Moreover, the potential utility of comparative or normative information is considerably tempered by the fact that norm groups may be inappropriate, and by the inability of most commercial tests to provide the kinds of subscore or item score information that help determine actual curricular strengths and weaknesses.

Because of these defects, institutions are increasingly designing their own cognitive assessment mechanisms--often "embedded" in the curriculum in some way. The most straightforward such device is a senior comprehensive examination in the major field. Senior examinations were once common features of undergraduate liberal arts curricula, and can be used both to "certify" individual student mastery of the field and to collectively provide evidence of program effectiveness. In some cases, as for example in eighteen colleges currently supported by an AAC project, external examiners are used as assessors. Other "course embedded" devices include pre-surveys of student learning and experience intended to help target the curriculum more effectively. For example, in core courses in the humanities, King's College uses instruments that determine the extent and nature of past student exposure to cultural events and aesthetic experiences. Finally, several colleges are currently experimenting with portfolio analyses and other "secondary reading" techniques. These

approaches use existing student "products" such as essay exams or course papers as evidence of curricular goal attainment, through a multiple-reader collective scoring process. For example, across some core courses at Kean College (NJ), faculty are including a few common final examination questions. Student essays generated in response to these questions are used by individual instructors to determine student course grades, but the essays themselves are then forwarded to an assessment reading committee that scores them collectively on cross-curricular criteria, using a scoring technique devised by ETS.

More familiar to institutional researchers is a third family of techniques --student surveys. A major advantage of surveys for assessment is their flexibility. A single instrument can be used to gather information on self-reported learning, on perceptions of the campus environment, on affective development, on the use of campus services, on goal change or fulfillment, and on a range of other dimensions. Major national surveys such as the CIRP, the ACT Evaluation Survey Service, and the NCHEMS/ College Board Student Outcomes Information Service are now heavily used as part of comprehensive assessment. Most institutions, however, quite rightly continue to design their own instruments suited to their own clienteles and instructional goals. Particularly important in the light of assessment objectives, however, are post-graduate or alumni surveys that can profile career attainment, success in further education, citizenship and contributions to community, and ongoing attitudes toward

learning. Such surveys generally form a critical component of any campus assessment effort.

A final method increasingly used in assessment is the use of "trace" data drawn from institutional records and archives. Most obvious here are student registration records that can support student tracking systems, and that can document patterns of course-taking and course performance. Like surveys, the construction and maintenance of longitudinal student enrollment files from registration records constitutes familiar territory to most institutional researchers. Less familiar may be the use of other kinds of institutional records for assessment purposes. Several institutions, for example, are now examining patterns of library circulation, book re-shelving after casual use, and requests for assistance from research librarians as partial evidence of the effects of new general education curricula that stress library research competence. Others are tapping data on patterns of student utilization of such services as learning assistance, placement, the bookstore, and cultural and athletic events or facilities. While all such "trace data" should be treated with confidentiality and care, such sources can provide a valuable supplement to more obtrusive data collection methods.

3. The Emerging Role of Institutional Research: While comprehensive assessment programs remain a relative rarity across the country, there are enough extant cases to support some tentative generalizations about the

role of institutional research. In some cases, institutional research offices have been given lead responsibility for carrying out assessment, and there are some compelling reasons for this. First, institutional research is at many institutions seen as the primary office for collecting and compiling data of all kinds. Because IR is "where data lives", the assessment function seems an appropriate add-on to existing responsibilities. Secondly, because assessment increasingly involves new external reporting requirements, institutional research is appropriately seen as the primary existing point of contact for providing accountability and compliance information of all kinds. Thirdly, for better or worse, institutional research professionals are perceived by administrators as having the kinds of technical skills needed to undertake assessment--skills such as statistical research experience, survey training, and techniques of data interpretation. Finally, the role of institutional research in providing decisionmakers with "management information" is often seen as highly compatible with assessment's thrust of using information to guide program and policy decisionmaking.

Despite the appropriateness of these points, heavy involvement in assessment activities will pose some sevére challenges to institutional researchers. Foremost among them is the fact that doing assessment will require institutional researchers to become considerably more involved with academic issues than has traditionally been the case. Because the primary emphasis of assessment is curricular and instructional, many

faculty will view such an IR role with suspicion. Moreover, institutional research offices usually lack the kinds of everyday contact with faculty and academic administrators that will be required to maintain an effective assessment program. Secondly, most institutional research professionals lack training in such areas as cognitive measurement and instrument construction. As a result, many will not be in a position to design and manage programs that rely heavily on such methods. Thirdly, effective assessment research requires a programmatic approach that is often at variance with the working rhythm of institutional research offices. Assessment studies will require considerable forward planning and careful, systematic execution--generally far in excess of the requirements of studies typically undertaken in response to an administrator request.

Given these issues, what have in fact been the roles that institutional researchers are playing? In general, I see three emerging roles in the institutions which I have observed. A first is staff support to institutional assessment committees. Composed of key faculty and administrators, such committees are becoming a common mechanism for beginning the implementation of a campus assessment program. Generally their charge is to examine national practice, to consider its implications, and to recommend policy for the institution. Together with representatives of testing offices, institutional researchers serve to support these discussions from a technical or experiential standpoint--pointing out the opportunities and drawbacks of particular data-gathering

approaches, and making members aware of existing institutional data resources. A second emerging role is that of coordinating diverse assessment data-gathering efforts, particularly in the arena of student surveys. In many cases, assessment activities have uncovered a range of existing but disconnected data-gathering efforts, and institutional research is assigned a "clearinghouse" responsibility intended to avoid duplication and to ensure technical quality in all outgoing surveys. A final emerging role, quite consistent with the IR role on many campuses, is as an official point of contact for generating external accountability reports connected with assessment.

While in many ways, assessment thus poses a new challenge to institutional research offices--one that may require additional resources and technical capabilities to make it a reality--it also returns the practice of institutional research to some of its earliest roots. Writing about the emergence of learning research at such pioneering institutions as the University of Chicago and the University of Minnesota in the thirties, Bob Pace notes the establishment of "offices of institutional research" as a key development. In the fifties, Pace maintains, such offices became involved in a wider range of activities, primarily oriented toward resource allocation, and thus lost their original instructional flavor and utility. The current assessment movement provides an excellent opportunity to return the profession to some of these important early

concerns. I believe that it is an opportunity very much worth taking advantage of, and that institutional research should welcome. In addition to aiding decisionmaking, we might just make a contribution to knowledge!

# HAS THE MIDDLE CLASS BEEN PRESSURED MOST? MULTIVARIATE ANALYSIS ON PARENTAL CONTRIBUTIONS TO HIGHER EDUCATION

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## INTRODUCTION

The growth of college tuition and fees has out-paced consumer prices in the 1980s. From 1980 through 1986, the cost of tuition and fees at private universities rose an average of 11.0% per year, while consumer prices increased 4.9% (Evangelauf, 1987). The Ivy/MIT/Stanford group, in particular, nearly doubled their prices over the last seven years, to an average $12,385 in annual tuition and fees for 1987-88 (COFHE, 1987).

At the same time, aid to finance higher education has been making rather slow progress. Total financial aid amounted to over $21 billion in 1985-86, but this reflects a decline of 3% between 1980-81 and 1985-86 after adjusting for inflation (Lanchantin, 1986). Federally-supported programs fell by 10% during this period after inflation adjustment, and are estimated to be reduced from $14.4 billion in 1986-87 to $14 billion in 1987-88 due to Gramm/Rudman/Hollings cuts.

The increasing discrepancy between the rapid growth in tuition and slow progress in public assistance has increased

pressure on family contributions and individual donations. Voluntary private support for higher education, including individual donations, rose by 17% and reached an estimated $7.4 billion in academic year 1985-86 (Desruisseaux, 1987). However, changes in family or parental contributions have not been well researched. This study (1) describes how much parental contributions have changed in the 1980s at a large private university and (2) examines which social strata have experienced the greatest change in contribution, using a multivariate data analysis technique.

## DATA SOURCES AND METHODOLOGY

The study analyzed financial aid recipients at Cornell University in academic years 1984-85 and 1987-88. The study was limited to those students who were determined to be financially dependent on their parents. Institutionally calculated parental contributions and parental income were converted into constant dollars, using a consumer price index of the current year as a base, so that the two-year figures were comparable after controlling for the impact of inflation (Lanchantin, 1986).

Before going into a detailed discussion of the results, it may be useful to describe briefly how parental contributions are calculated. The parental contribution (PC) to a student's education is computed based on three major elements; income, total assets and the number of children in college per household.

Total family income is the sum of taxable and non-taxable income, and the total income less family expenses/allowances results in available income. Available income is the first major component of the PC calculation.

The second is assets. Total assets include cash, savings and checking accounts, home equity, equity in investments and other real estate, and business or farm equity. The income supplement is a percentage of the remainder of total assets less an asset protection allowance. The available income and income supplement are added together to derive the parents' adjusted available income. Total parental contribution to education is a percentage of adjusted available income.

Finally, the contribution for each student is computed by dividing the total contribution by the number of children in college per household.

Keeping this formula in mind, let us examine the results presented in Table 1. Table 1 describes the mean difference in parental contributions per child between the two years. Parental contributions increased from $3,719 in 1984-85 to $4,470 in 1987-88 on average. Broken down by income, all groups experienced some increase in contributions. The Analysis of Variance tests (ANOVA) indicate that the mean difference between the two years is statistically significant for all the groups, except for the least wealthy income category (less than $10,000) and the highest income group (more than $80,000). The middle income families, particularly

Table 1
Dependent Undergraduates with Financial Aid
Mean Difference in Parental Contributions
Fall 1984 vs. Fall 1987

| Income | 1984 Mean PC (N) (Constant $) | 1987 Mean PC (N) (Constant $) | 87-84 | F Value | Sign. Level |
|---|---|---|---|---|---|
| Whole | 3,718.8 (5134) | 4,470.0 (4871) | 751.2 | 123.50 | p<.001 |
| 0-10K | 765.6 (328) | 934.4 (345) | 168.8 | 1.52 | n.s. |
| 10K-20K | 1,052.3 (768) | 1,480.8 (665) | 428.5 | 20.51 | <.001 |
| 20K-30K | 2,078.0 (864) | 2,543.0 (763) | 465.0 | 19.82 | <.01 |
| 30K-40K | 3,335.1 (953) | 3,652.2 (825) | 317.1 | 8.58 | <.01 |
| 40K-50K | 4,671.2 (850) | 5,379.4 (752) | 708.2 | 28.89 | <.001 |
| 50K-60K | 5,707.7 (652) | 6,590.3 (591) | 882.6 | 29.10 | <.001 |
| 60K-70K | 6,939.9 (375) | 7,629.1 (431) | 689.2 | 10.09 | <.01 |
| 70K-80K | 7,429.0 (184) | 8,215.9 (244) | 786.9 | 6.93 | <.01 |
| Over 80K | 8,737.1 (160) | 8,941.1 (255) | 204.0 | 0.43 | n.s. |

Table 2
Dependent Undergraduates with Financial Aid
Mean Difference in # of Children in College per Household
Fall 1984 vs. Fall 1987

| Income | 1984 Mean (N) | 1987 Mean (N) | 87-84 | F Value | Sign. Level |
|---|---|---|---|---|---|
| Whole | 1.64 (5134) | 1.58 (4871) | -0.06 | 21.46 | p<.001 |
| 0-10K | 1.43 (328) | 1.33 (345) | -0.10 | 4.19 | <.05 |
| 10K-20K | 1.49 (768) | 1.48 (665) | -0.01 | 0.07 | n.s. |
| 20K-30K | 1.48 (864) | 1.45 (763) | -0.03 | 1.01 | n.s. |
| 30K-40K | 1.58 (953) | 1.51 (825) | -0.07 | 4.08 | <.05 |
| 40K-50K | 1.64 (850) | 1.55 (752) | -0.09 | 6.89 | <.01 |
| 50K-60K | 1.80 (652) | 1.61 (591) | -0.19 | 23.27 | <.001 |
| 60K-70K | 1.94 (375) | 1.77 (431) | -0.17 | 11.63 | <.001 |
| 70K-80K | 2.13 (184) | 1.93 (244) | -0.20 | 6.51 | <.05 |
| Over 80K | 2.20 (160) | 2.09 (255) | -0.11 | 1.98 | n.s. |

the families in the range of $50K-$60K income, underwent the most significant increases in PC. They had to add nearly $900 to their contributions this year, compared to what they contributed three years ago.

At least two possible explanations could be provided as to why we have observed the biggest increase in PC among middle income families. First, the number of children in college per household in the middle class might have significantly decreased in 1987-88, compared to 1984-85, so that the PC for each student significantly increased this year. Second, total assets in the middle class might have increased much faster than others over the past three years, and thus, the parental contributions from the assets among middle income families in 1987 became much higher than that in 1984.

Since other analysis, not presented here, showed that there is no significant mean increase in total income in each income category between the two years, we discarded the possible explanation that the rapid increase in PC in the middle class may be attributed to the faster growth in income of this class than others.

## RESULTS

Table 2 compares the mean number of children in college per household between 1984-85 and 1987-88. Our data shows a significant decrease in the number of children in college among upper-middle income families. The $50K-60K income

family, for instance, had an average of 1.80 children in college three years ago, but 1.61 this year. Cornell University began verifying the number of children in college in 1985-86 and has seen a discrepancy between the reported number and the actual number of children in college in some cases. Our finding may be partially attributed to this verification procedure.

The results presented in Table 3 examine how much contributions from assets per child have changed in the last three years, after controlling for the number of children in college per household. In other words, a test is run to see whether the difference in estimated mean PCs between the two years is significant, assuming every family had the same number of children in college. For this purpose, the ANCOVA (Analysis of Covariance) technique is used to control for the covariate, (the number of children in college per household) and test the significance of the difference in mean PCs from assets. It is the $40K-70K income families that have experienced the most significant growth in parental contributions from assets. The families with $50K-60K, for example, had a $1,099 contribution from assets in fiscal year 1985 on average, and a $1,314 contribution this year.

The results presented in Tables 2 and 3 clearly indicate that a decrease in the number of children in college per household and a rapid growth in PC from assets are important factors, which contribute to changes in PC in general, and to a significant increase in PCs among the middle income

Table 3
Dependent Undergraduates with Financial Aid
Least-Squares Mean Difference in Contributions from Asset
Fall 1984 vs. Fall 1987
After Controlling for # of Children in College

| Income | 1984 L.S.Mean(N) PC from Assets (Constant $) | 1987 L.S.Mean(N) PC from Assets (Constant $) | 87-84 | F Value | Sign. Level |
|---|---|---|---|---|---|
| Whole | 993.9 (5134) | 1,158.1 (4871) | 164.2 | 28.19 | p<.001 |
| 0-10K | 448.0 (328) | 491.7 (345) | 43.7 | 0.17 | n.s. |
| 10K-20K | 584.8 (768) | 754.3 (665) | 169.5 | 5.31 | <.05 |
| 20K-30K | 885.8 (864) | 966.9 (763) | 81.1 | 1.00 | n.s. |
| 30K-40K | 1,098.8 (953) | 1,129.4 (825) | 30.6 | 0.17 | n.s. |
| 40K-50K | 1,220.4 (850) | 1,435.3 (752) | 214.9 | 6.99 | <.01 |
| 50K-60K | 1,099.2 (652) | 1,313.5 (591) | 214.3 | 7.75 | <.01 |
| 60K-70K | 1,302.8 (375) | 1,606.3 (431) | 303.5 | 9.77 | <.01 |
| 70K-80K | 1,402.5 (184) | 1,356.4 (244) | (46.1) | 0.13 | n.s. |
| Over 80K | 1,376.5 (160) | 1,549.0 (255) | 172.5 | 1.12 | n.s. |

Table 4
Dependent Undergraduates with Financial Aid
Least-Squares Mean Difference in Parental Contribution
Fall 1984 vs. Fall 1987
After Controlling for # of Children in College
and Parental Contribution from Assets

| Income | 1984 L.S.Mean (N) (Constant $) | 1987 L.S.Mean (N) (Constant $) | 87-84 | F Value | Sign. Level |
|---|---|---|---|---|---|
| Whole | 3,825.2 (5134) | 4,357.9 (4871) | 532.7 | 90.32 | p<.001 |
| 0-10K | 782.2 (328) | 918.7 (345) | 136.5 | 1.84 | n.s. |
| 10K-20K | 1,127.5 (768) | 1,394.0 (665) | 266.5 | 17.35 | <.001 |
| 20K-30K | 2,123.3 (864) | 2,491.6 (763) | 368.3 | 28.25 | <.001 |
| 30K-40K | 3,381.5 (953) | 3,598.7 (825) | 217.2 | 9.26 | <.01 |
| 40K-50K | 4,844.3 (850) | 5,183.8 (752) | 339.5 | 15.61 | <.001 |
| 50K-60K | 6,003.6 (652) | 6,263.9 (591) | 260.4 | 4.94 | <.05 |
| 60K-70K | 7,258.0 (375) | 7,352.4 (431) | 94.4 | 0.30 | n.s. |
| 70K-80K | 7,588.2 (184) | 8,095.8 (244) | 507.6 | 4.65 | <.05 |
| Over 80K | 8,849.4 (160) | 8,870.6 (255) | 21.2 | 0.01 | n.s. |

families, in particular. We must then examine how much parental contributions have changed in the last three years, after controlling for the variance attributed to the number of children in college per household and PCs from assets. Again, the ANCOVA (Analysis of Covariance) technique is used to control for the two covariates.

Table 4 presents estimated mean values (least-squares means) of parental contributions when all the covariates, the number of children in college and contributions from assets, are held constant at their mean values (Searle, Speed and Milliken, 1980). F tests are run to see the statistical significance between the two estimated means.

The families with over $50K annual income no longer demonstrate highly significant differences in parental contributions between 1984-85 and 1987-88, after the variance attributed to the covariates was accounted for. For example, before controlling for the two covariates, the mean PC difference between the two years in the $60K-70K income group was statistically significant with 10.1 F value (See, Table 1). When the variance was accounted for by the covariates first, the mean PC difference became no longer statistically significant with .30 F value (See, Table 4). In other words, the growth in PCs among the $50K-80K income families in the last three years can be attributed to the significant increase in contributions from assets and/or the decrease in the number of children going to college.

In contrast, the families with $10K-40K income

demonstrated a highly significant increase in contributions, even after controlling for the two covariates. Referring to Table 3 again, these families have not really experienced growth in contributions from their assets, probably because they do not possess substantial assets as such. Instead, they have seen a significant increase in their parental contributions from their incomes.

Finally, close attention must be paid to the $40K-50K income group in Table 4. As demonstrated in Tables 2 and 3, this is the group that has experienced a significant decrease in the number of children in college and a large increase in contributions from assets. Yet, even after controlling for these two covariates, the families in this income group clearly show a significant increase in contributions over the last three years. Based on this result, it can be stated that it is the middle income families with the annual income of $40K-50K, who have seen the greatest increase in the amount they are expected to pay toward private college education for their children.

## SUMMARY AND CONCLUSION

This study analyzed undergraduate dependent financial aid recipients at Cornell University in academic years 1984-85 and 1987-88. The study examined three major components (i.e. total income, assets and the number of children in college) and how they affected parental contributions (PCs) to higher education. All dollar figures were converted into constant

dollars so that the two-year figures were comparable. The results indicate that all income groups, except the least wealthy and the highest income category, experienced significant increases in PCs between the two years. When the covariates, the number of children in college per household and contributions from assets, were controlled for, the study found: (1) families with over $50K income no longer demonstrated highly significant differences in PCs, indicating the increment in PCs can be attributed to a decrease in the number of children in college and/or an increase in PCs from assets; (2) in contrast, families with $10K-40K income did not show a highly significant growth in contributions from assets, but instead demonstrated a substantial change in PCs mainly from income; and (3) most importantly, families with $40K-50K income experienced a significant decrease in the number of children in college, an increase in PCs from assets and still demonstrated a significant increment in PCs between the two years even after controlling for the two covariates. Our results indicate that these families ($40K-50K) have endured the most pressure in paying for their children's college education. This information should be useful to those involved in shaping financial aid policies at institutional, state and national levels.

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# USING TELEPHONE SURVEYS OF STUDENTS TO GATHER SENSITIVE DATA ABOUT CONTROVERSIAL TOPICS

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Routinized random sample surveys of undergraduates conducted by the Student Affairs and Evaluation Office (SAREO) at the University of Massachusetts/Amherst help the University community monitor trends in student opinion and assess the need for services. Accordingly, while many of the topics studied throughout the academic year by SAREO are relatively non-controversial from the point of view of researchers and those likely to use the information that is gathered, Student Affairs' researchers also occasionally are faced with institutional demands for data of a more sensitive nature. For example, subject matter related to issues such as contraception and sexually transmitted diseases are personal areas that many data collectors might be reluctant to explore. However, the consequences of no research on these topics could pose serious public health threats to students on campus. Other topics, such as racism and sexual harassment tend to be emotionally charged subjects which also are difficult to study, although again relevant data in these areas might be well worth the trouble.

Our paper describes the survey methodology used by SAREO to collect data from students with respect to their contraceptive practices, their level of knowledge of AIDS, and their attitudes toward racism on campus. Some attention is paid to the issue of questionnaire and item construction. Additional discussion centers upon interviewer training, the potential for discomfort during the interview, and the response rates of non-threatening versus threatening topics and questionnaire items. Finally, the applicability of sensitive information for decision-making at the University is discussed with a judgment rendered of whether or not these data can be collected with validity, and whether or not such data are worth collecting for the incurred cost.

Data Collection at the University of Massachusetts and Project Pulse

Project Pulse at the University of Massachusetts illustrates a systematic data collection operation that gathers timely information for university administrators. Random samples of the undergraduate student population are drawn from the full student database that is managed by the Registrar's Office. Interviews then are conducted over the telephone by trained student interviewers who typically receive work-student funds, and hence, cost the research organization only about thirty percent of their hourly wages.

Project Pulse was established in 1972 to gather data that administrators could use in developing policies that affect the undergraduate student population. Similar to many universities at that time, the University of Massachusetts had no means to collect data from students during a period in history that is distinguished by student activism and unrest on college campuses across the country.

The usual methods of monitoring undergraduate opinions and needs of the time, such as student government elections or community forums, failed to adequately represent the student body. Elections typically drew only twenty-five percent of all students and community forums ran a very high risk of attracting only the most outspoken individuals interested in a particular topic.

In order to collect representative information, the Division of

Student Affairs devised a low-cost, weekly telephone survey system. Eventually, the University established SAREO as the administrator of this ongoing operation. Fifteen years later, Project Pulse continues to follow a weekly schedule during the fall and spring semesters. Largely relying upon Project Pulse, SAREO collects data which serve research goals related to program evaluation, need assessment, public opinion, basic research, and special research.

Project Pulse as a Tool for Collecting Sensitive Information

Since Project Pulse is conducted for the benefit of administrators in Student Affairs who are responsible for the welfare of some 18,000+ students, areas under study generally relate to the quality of student life on campus. Accordingly, research objectives typically range from those related to assessing students' attitudes toward University services to those which speak to better understanding undergraduates' level of knowledge about various public health threats. The focus of our paper is the far end of this spectrum.

Public health risks on campus might include those associated with alcohol and drug consumption, sexually transmitted diseases, and contraception. Clearly, these last two exemplify especially difficult areas of study for survey research. Interviewers may not feel comfortable asking questions about sexual behavior and respondents may be reluctant to initially participate in such a survey or to fully cooperate in answering all questions they are asked.

Other topics that are not health-related may be equally problematic for survey researchers to explore if the topic itself is controversial. For example, racism among undergraduates is a phenomenon that appears to have returned to some college campuses that administrators and the majority of students likely would rather not acknowledge. Administrators at many institutions may be reluctant to support data collection on this front while students with prejudicial attitudes chosen as respondents might be unwilling to fully admit having racially based preconceptions or confess to associating with others who share racist sentiments.

Public health knowledge and prejudicial attitudes are two kinds of

information that individuals might feel uncomfortable discussing over the telephone with unfamiliar persons. However, each is different in the way it causes the respondent discomfort. The former relates to a "sin of omission" where those questioned either do not wish to admit to something they have not done that they should have or do not know something that they believe everyone probably knows. The latter falls under the realm of a "sin of commission". Here the respondent is confessing to having committed an abhorrent act or possessing undesirable opinions or attitudes.

The data presented below in Tables 1 through 3 show items that have been asked over the telephone during the administration of three separate Project Pulse surveys. These items were used in an attempt to gather information about students' knowledge of contraception and sexually transmitted diseases (e.g., AIDS) and their attitudes toward racism on campus. The pages below also offer some discussion of the level of cooperation achieved by the various Project Pulse surveys.

Data Presentation

In order to judge whether or not sensitive topics influence respondents' willingness to participate in a survey, the reader first must be given some information about cooperation rates that might be expected during the administration of a typical Project Pulse survey. Such information then might serve as a baseline measure to which the cooperation rates from surveys on non-threatening subjects might be compared. The same holds true for examining the response patterns for individual questionnaire items that appear to threaten or embarass respondents and/or interviewers. To make these comparisons it first is necessary to have some idea of the rates by which respondents refuse to answer innocuous questions before we may know if refusal rates for sensitive questionnaire items are noticeably different.

Project Pulse surveys are regularly administered to random samples of undergraduates during the fall and spring semesters by work-study students trained to conduct telephone surveys of this nature. Interviewers are paid $4.50 hourly and ordinarily work from 5:00 to 10:00

PM each Wednesday night. Presently, interviewers record responses on coding sheets and then transfer the data to machine-readable Opscan forms, although the near future promises a switch from pencil and paper questionnaires to electronic questionnaires that save data on computer disk. All the data discussed below were collected by the former method. The tone for any Project Pulse is set within the first few minutes of the telephone contact. For example, during the survey on athletics (February 11, 1987), interviewers asked for the respondent by name, introduced themselves and then stated that they were calling for Project Pulse "for the University Athletic Council." As in all Project Pulse surveys, after defining the night's mission and assuring that all responses would be kept confidential, interviewers next asked respondents if they were willing to answer a few questions which should only take up about five minutes of the respondent's time.

The Athletic Council survey illustrates a typical, non-threatening Project Pulse survey instrument. Initially, a random sample of approximately 1,000 names was selected from the list of undergraduates enrolled full-time at the University. Of this number, 874 student telephone numbers were dialed up to three times during the five-hour period by twenty Project Pulse interviewers. Interviewers recorded 379 persons as "not home." Of those remaining, 67 were found to have unobtainable phone numbers, 4 were no longer students, and 60 were in but refused to participate. Completed interviews then accounted for 41.6 percent of those students whose telephone numbers were dialed or 85.8 percent of the students who were contacted.

The opening procedure for the Contraception (October 15 and 29, 1986) and AIDS (March 4 and 11, 1987) surveys was similar to other Project Pulse surveys, although the sentence describing the questionnaire topic was replaced in both instances by a paragraph explaining the nature of the research in more detail. In the first case, interviewers began by informing students that they had been asked by the "Division of Health Education at the University Health Services to gather information on the student's awareness of contraception services." In the AIDS survey, interviewers initially told students that they had been asked by the

"University Task Force on AIDS Education to gather information on students' knowledge, attitudes and practices towards AIDS." In contrast to these surveys, but more similar to most other Pulse surveys, the racism questionnaire (April 15 and 22, 1987) introduced its topic with a single sentence before asking students if they were interested in participating. The sentence simply stated that interviewers were "doing a telephone survey for the Human Relations Office concerning racism."

The cooperation rates for those students that were contacted for the Contraception, AIDS, and Racism studies were 64.0 percent, 74.6, and 76.3 percent, respectively. These rates are considerably lower than the 85.8 noted for the Athletic Council survey. Similarly, the representativeness of the samples to the full student body for these three surveys--31.0, 31.6, and 33.6 percent, respectively--are much lower than for the survey on athletics (41.6%).

Response patterns for individual items from each of these three surveys might indicate the effect of particularly sensitive questions once the interview is underway. If threatening questions do influence responses it likely is the case that this effect will take one of two forms. First, and more difficult to detect, is the question of whether or not response patterns for an item are skewed toward favorable responses. This form of bias probably occurs more often with "sin of commission" topics such as racism where respondents do not want to present an unnecessarily negative image of themselves to others. Second, missing data attributable to refusals (e.g., "don't know" or "no answer") might occur more frequently for sensitive items compared to how often they occur for non-threatening questions in the same questionnaire.

The problem of exaggerated responses is difficult to address unless valid data are available from some previous point in time that allow worthwhile comparisons. Since no data have been collected on the AIDS and racism topics previously at the University and available contraception data is at least four years old, we instead concentrate on examining the data to see if refusal rates have been affected.

Table 1 shows five items from the Contraception survey and their responses. The first two might be considered innocuous while the other three appear to be more personal.

Table 1. Responses to the Contraception Items (N = 272 Females)

| | | n | % |
|---|---|---|---|
| Q1. | Who would you prefer to receive information from... | | |
| | Health Services staff members | 182 | 66.9 |
| | Students educated in contraceptive methods | 74 | 27.2 |
| | (missing) | 16 | 5.9 |
| Q2. | Did you know you can attend an education session even if you don't want to obtain contraceptives? | | |
| | Yes | 199 | 73.2 |
| | No | 63 | 23.2 |
| | (missing) | 10 | 3.7 |
| Q3. | Have you ever purchased contraceptive methods from the Health Services pharmacy? | | |
| | Yes | 98 | 36.0 |
| | No | 165 | 60.7 |
| | (missing) | 9 | 3.3 |
| Q4. | Have you ever used contraceptive methods? | | |
| | Yes | 185 | 68.0 |
| | No | 79 | 29.0 |
| | (missing) | 8 | 2.9 |
| Q5. | Have you ever had a physical exam at the Health Services in order to obtain contraceptives? | | |
| | Yes | 91 | 33.5 |
| | No | 165 | 60.7 |
| | (missing) | 16 | 5.9 |

Table 2 presents data for four items from the AIDS survey. Again, the first two questions might be considered non-threatening while the other two likely are not.

Table 2. Responses to the AIDS Items (N = 294)

| | | n | % |
|---|---|---|---|
| Q1. | If you wanted more information about AIDS, which one of the following ways would you prefer to obtain it? | | |
| | Pamphlets from Health Services | 117 | 39.8 |
| | Articles in newspapers or magazines | 88 | 29.9 |
| | Recorded messages available by calling IDB/TIPS | 11 | 3.7 |
| | Consulting a health practitioner | 60 | 20.4 |
| | Workshops | 11 | 3.7 |
| | Office of Gay, Lesbian, Bisexual Concerns | 4 | 1.4 |
| | Other | 3 | 1.0 |

| | | |
|---|---|---|
| Q2. Which one of the following best describes how you feel about the information you've received about AIDS? | | |
| I have enough information, and I have a clear understanding of the issues. | 121 | 41.2 |
| I have received a lot of information, but I am still very confused. | 93 | 31.6 |
| I have not received enough information, and would like more. | 61 | 20.7 |
| I have not received much information, but I'm not interested in finding out more. | 16 | 5.4 |
| (missing) | 3 | 1.0 |
| Q3. To what extent do you feel susceptible to contracting the AIDS virus? | | |
| To a very great extent | 1 | 0.3 |
| A great extent | 8 | 2.7 |
| Some extent | 45 | 15.3 |
| A little extent | 108 | 36.7 |
| Not at all | 131 | 44.6 |
| (missing) | 1 | 0.3 |
| Q4. Has your behavior changed in response to the AIDS epidemic? | | |
| Yes | 125 | 42.5 |
| No | 167 | 56.8 |
| (missing) | 2 | 0.7 |

Finally, Table 3 shows the responses to items from the Racism survey. And, as in the other tables, the less threatening questions appear as the first two items while the last two represent more threatening examples.

Table 3. Responses to the Racism Items (N = 428)

| | n | % |
|---|---|---|
| Q1. Since you have been at UMass, to what extent has racism been discussed in your classes? | | |
| To a great extent | 54 | 12.6 |
| To some extent | 126 | 29.4 |
| To a very little extent | 128 | 29.9 |
| Not at all | 120 | 28.1 |

Q2. To what extent do you think entering UMass students would benefit from an orientation to the many cultures and lifestyles represented on campus?

| | | |
|---|---|---|
| To a great extent | 186 | 43.5 |
| To some extent | 154 | 36.0 |
| To a very little extent | 68 | 15.9 |
| Not at all | 19 | 4.4 |
| (missing) | 1 | 0.2 |

How often have you heard or seen each of the following types of racial harassment? [Lead-in to Q3 and Q4]

Q3. Course instructors or other staff members stereotyping, making negative remarks about or telling jokes that "put down" racial minorities?

| | | |
|---|---|---|
| Frequently | 4 | 0.9 |
| Sometimes | 58 | 13.6 |
| Rarely | 99 | 23.1 |
| Never | 267 | 62.4 |

Q4. Other students stereotyping, making negative remarks about or telling jokes that "put down" racial minorities?

| | | |
|---|---|---|
| Frequently | 71 | 16.6 |
| Sometimes | 193 | 45.1 |
| Rarely | 126 | 29.4 |
| Never | 38 | 8.9 |

Discussion

The amount of missing data in Tables 1 through 3 suggests that non-threatening and threatening items are not distinguishable by the responses given to them. For each of the three sets of items, percentages of data missing for the sensitive items are well within the ranges for those of the innocuous items.

While we were not able to assess the extent to which respondents gave more "favorable" answers than they would have if we had administered a perfectly valid survey instrument, the available data suggest to us that the observed responses were not upset by the nature of the topic. In fact, the pattern of missing data for these data suggests that researchers might be able to attempt even more sensitive questions than these once they have respondents on the line, provided of course that their research goals might benefit substantially from doing so.

Examination of the cooperation rates for the three Project Pulse surveys from Tables 1-3 and the Athletic Council survey suggests that campus research on controversial or sensitive topics runs a much greater risk of non-response. That is, fewer students will agree to be interviewed if the subject of a study is somewhat extraordinary.

Open to speculation is whether or not the topic itself must necessarily be portrayed as threatening. We cannot be sure that disguising the questionnaire won't solve part of the initial cooperation problem, although such a ruse might raise ethical considerations. Similarly, we cannot know if interviewer discomfort contributes to non-response in any measurable way and whether or not this could be alleviated when it does exist. Also open to speculation is the actual consequence of non-response. We know little about how those who agree to interviews compare with those who refuse.

## Conclusion

Information useful for administrators is not always of the voting variety. Rather than simply asking about someone's preference for a particular commodity, decision-makers sometimes are faced with the task of asking the difficult questions that touch on sensitive social problems on campus.

The data produced in the examples shown here was more difficult to collect than data from typical surveys conducted by SAREO. A larger proportion of the student sample (approximately 10%) refused to participate when the topic was controversial than when it was not. However, in terms of policy utility, these data probably have farther reaching consequences than data of the usual variety.

For example, the Athletic Council survey has not, to our knowledge, provided any information that University decision-makers have used. Data from the AIDS survey, on the other hand, has prompted the University's Task Force on AIDS to develop the Faculty Forum [on AIDS] which included a series of lectures on campus throughout the month of October, along with the distribution of AIDS information through the local media. While it is not clear whether the AIDS data itself provoked this response, it

arguably is the case that the sensitive information collected by Project Pulse was a necessary first step in confirming that such a process should occur.

Methodologically, the data presented here suggest that adult questions can be asked of students on college campuses. The rub, however, is that more students will decline an interview when the survey topic is sensitive than when it is not. Future research on college campuses might consider ways to improve cooperation rates for surveys that are potentially controversial, perhaps looking more closely at the characteristics of non-respondents themselves that make them wary of participating in interviews over the telephone.

# THE CONTENT ANALYSIS OF MEDIA COVERAGE

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The public image of a college is heavily influenced by coverage of that institution in the media. This is especially true for community colleges, which draw most of their students from the local region where media coverage is the greatest. While colleges are universally concerned about their image and spend a great deal of time and energy in attempts to shape and mold this image through public relations and other marketing activities, they do not often systematically track and analyse the effects of these efforts.

## I ANALYSING THE CONTENT OF MEDIA COVERAGE

One way to study the image of a college portrayed through the media is to examine the newspaper coverage of the college, using the technique of content analyse. Content analysis is simply the systematic coding of well-defined aspects of a body of messages; and in the case of newspaper coverage, the messages would consist of items describing the college that were published in a set of newspapers. Perhaps the only type of item that should be excluded from such a study would be advertisements placed by the college itself.

### Information to be Coded

It is useful in such a study to code information concerning three main aspects of each item:
(1) information about the context and structure of the item, including the newspaper, the date, the length of the item and whether or not it is accompanied by a picture;
(2) information about the subject discussed in the item, broken down into major categories and subcategories; and

(3) information about the impression (positive, neutral, mixed, or negative) given by the item and its component parts, e.g., the headline, the picture, the first paragraph and the item as a whole.

Definition of Categories

The information to be coded about each of these aspects needs to be defined precisely to ensure the reliability and validity of the data. In particular, instructions about how to code the impression given by the item need to be very specific. In the case of the study described below, any item which contained only information from a press release prepared by the college was coded as "positive." Any item that was not based only upon information released by the college but which included only positive value judgments was also coded as "positive." Any item which was not based solely upon information released by the college but which was purely factual or which included both positive and negative value judgments was coded as "neutral or mixed," respectively. Finally, any item which was not based only on information released by the college and which included only negative value judgments was coded as "negative."

Data Collection and Entry

In order to code the information, the newspapers have to be selected, the items have to be collected, and then codes have to be entered into a data file for analysis. Colleges usually subscribe to a newspaper clipping service or to a selected set of papers from which they routinely clip items, so selection of papers and collection of the items themselves is often simply a matter of getting access to the files in the Office of Public Relations. The process of coding and data entry is nearly identical to the process by which survey data is coded and entered, and should therefore be routine for an office of institutional research.

Data Analysis

Finally, the analysis of content analytical data is similar to the analysis of most institutional data. Frequency distributions of the items carried by each of the papers, of the subjects described in the items, and of the positive, neutral/mixed, and negative items are useful for describing coverage of the college in general. Crosstabulations (with the results described in line graphs) of the items carried in each paper each year and of the impression conveyed by the items in each paper each year give a good sense of the trends in coverage. Beyond that, trends in the coverage of and impression conveyed about specific topics by specific papers can also reveal a great deal about the editorial policy of each paper and about the success of the college in managing its image on different subjects in different papers.

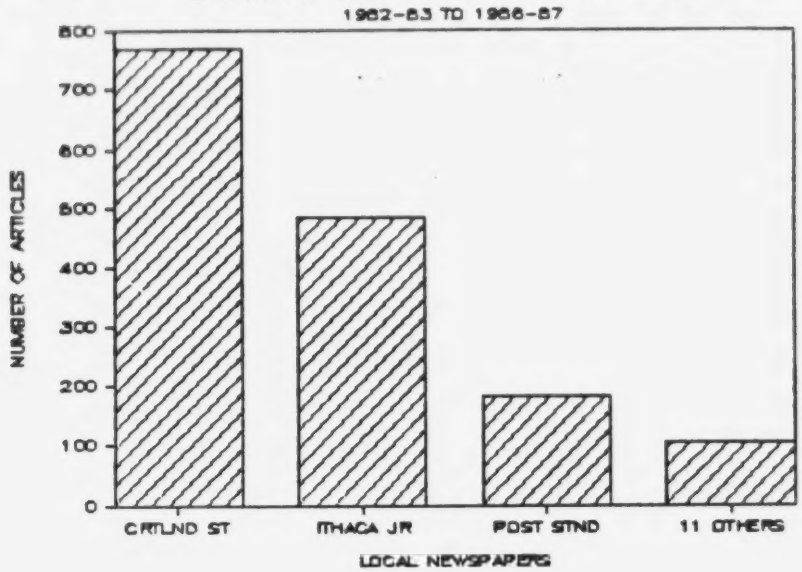
## II A CASE STUDY OF MEDIA COVERAGE

Last year the image of Tompkins Cortland Community College as portrayed in regional newspapers from the Fall of 1982 through the the Spring of 1986 was studied using content analysis. This year the study was updated to include items published in the 1986-87 academic year. The database now includes 1,542 news items which appeared in 14 papers. The college is sponsored by Tompkins and Cortland counties, each of which has one major daily paper (the Ithaca Journal and the Cortland Standard, respectively). In addition the area is served by numerous weekly papers and several regional publications.

General Findings

Figure 1 shows that 93% of the news items appearing in the regional print media were carried by three area newspapers: the Ithaca Journal (32%), the Cortland Standard (50%) and the Syracuse Post-Standard (12%). Eleven other regional weekly newspapers carried the remainder (7%) of the items. Although items ranged from one to 55 column-inches in length, the average length of an item was 8 column-inches. Newspapers ran a picture along with a news item 17% of the time, with coverage of special events accompanied by multiple pictures.

FIGURE 1. COVERAGE OF THE COLLEGE




The subjects which received the most coverage--both in terms of number of items and in terms of length of coverage--are described in Table 1.

TABLE 1. COVERAGE OF GENERAL TOPICS

| | 1982-1987 | | 1986-1987 | |
|---|---|---|---|---|
| SUBJECT | NEWS ITEMS | COLUMN INCHES | NEWS ITEMS | COLUMN INCHES |
| Continuing Education | 22% | 6% | 15% | 12% |
| Students | 12% | 8% | 25% | 20% |
| Academic Programs | 11% | 9% | 7% | 7% |
| Finances | 10% | 11% | 7% | 6% |
| Community Service | 9% | 6% | 11% | 9% |
| Athletics | 8% | 7% | 18% | 14% |
| Policies, Plans & Actions | 8% | 11% | 6% | 5% |
| Student Services | 7% | 6% | 6% | 5% |
| Faculty Union | 6% | 11% | 3% | 2% |
| Individual Faculty | 6% | 9% | 8% | 6% |
| President | 5% | 11% | 7% | 6% |

Eleven percent of the news items described in Table 1 provided coverage of academic programs. Table 2 describes the distribution of this coverage across the programs at the College.

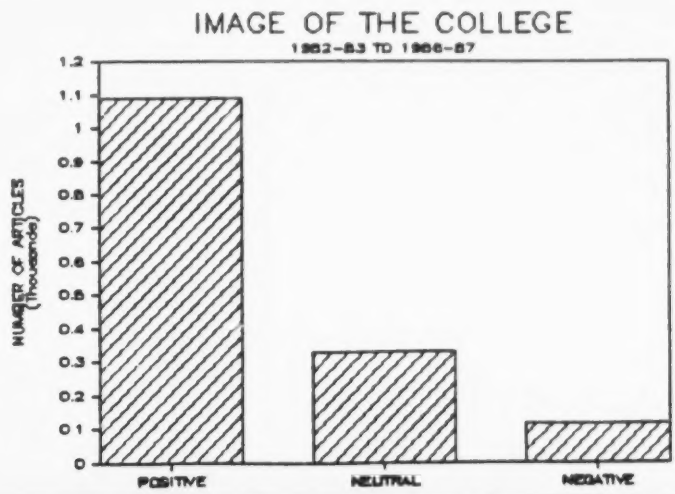
TABLE 2. COVERAGE OF ACADEMIC PROGRAMS 1982-1987

| | NUMBER OF ITEMS | PERCENT OF ITEMS |
|---|---|---|
| Specific Courses | 66 | 43.7% |
| Non-Degree Programs | 44 | 29.1% |
| Programs in General | 25 | 16.6% |
| Nursing | 13 | 8.6% |
| Business Administration | 12 | 7.9 |
| Data Processing | 11 | 7.3% |
| Liberal Arts | 9 | 6.0% |
| Accounting | 8 | 5.3% |
| Computer Science | 8 | 5.3% |
| Wine Marketing | 8 | 5.3% |
| Other | 73 | 47.4% |

NOTE: Items may cover more than one program. Therefore, figures in the "percent" column total to more than 100.

Of the 1,542 articles which have appeared in regional papers since 1982, 1095 (71%) were rated by the coders as creating a positive impression of the college, 123 (8%) as negative and 324 (21%) as neutral or a mixture of both positive and negative. This findings is described in the next figure.

FIGURE 2.

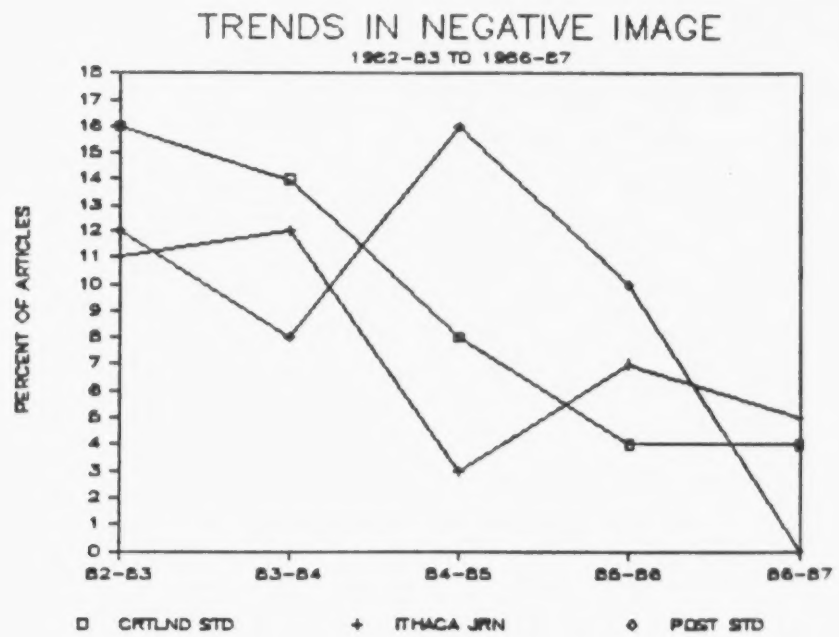


Trends in Coverage

The amount of coverage received by the college in total has remained about the same across the five academic years from 1982-83 through 1986-87. There are some striking trends, however, in the amount of coverage when analysed by paper. For example, the number of articles that have appeared in the Ithaca Journal each academic year has decreased from a high of 112 in 1983-84 to a low of 69 in 1985-86. Conversely, coverage in the Cortland Standard has increased from a low of 96 items in 1983-84 to 216 last year. Coverage in the Syracuse Post-Standard has remained at about the same level each of the last four years.

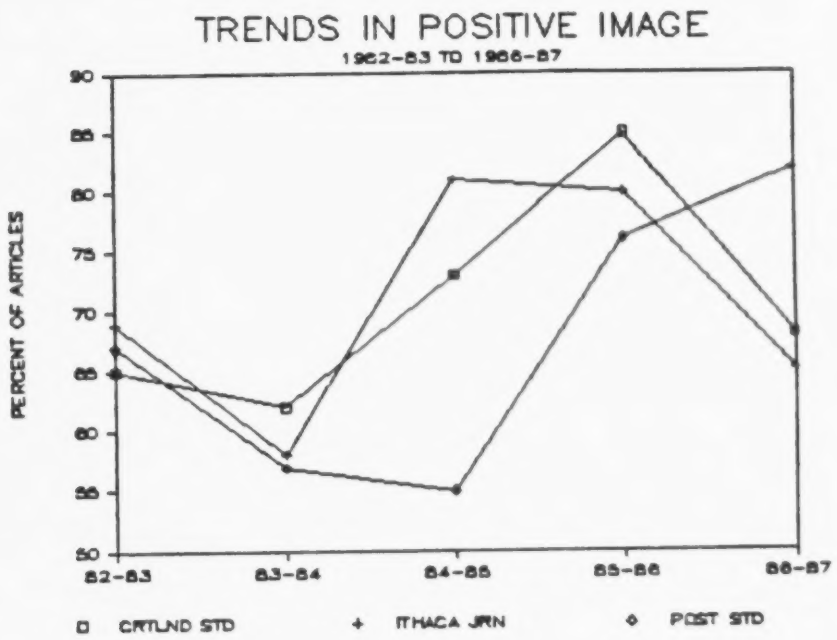
When coverage of various subjects is analysed by year, some definite trends emerge. There was a definite uptrend in coverage of community and student service programs since 1983-84. Conversely, stories on policies, plans and actions of the college are down. Faculty union coverage is way down from the troubled year of 1983-84, when there were 40 stories in the local press on the negotiation of a first contract. This year--in which a second contract was negotiated--there were only 9.

FIGURE 3.



As described in Figure 3 above, positive coverage of the college decreased this year over last in both the Ithaca Journal and the Cortland Standard, while coverage in the Post-Standard bucked this trend. There was a corresponding increase in the neutral or mixed category of coverage, while the percent of negative stories appearing in these papers held steady, except for the Post-Standard where it declined, as indicated in Figure 4, below.

FIGURE 4.




Conclusions

Because the regional paper from Syracuse generally covers only problems and controversies such as difficult labor negotiations, budgetary problems, bomb threats, hazardous waste spills, etc., the increase in positive items in this paper indicates a general improvement in the image of management at the college. However, the decrease in positive coverage in the two local papers is probably not helping to increase enrollments. A more detailed analysis should indicate on what specific topics positive coverage has declined, and targeted public relations efforts can be implemented to reverse the trend.

As described above, the database created through content analysis makes it possible to examine in some detail the image of the college as it appears in the local press and to track that image through time. Thus it can be used to measure the effectiveness of college leaders in managing controversy and the success of public relations efforts in promoting a positive image of the college.

## APPENDIX: A SET OF CATEGORIES FOR ANALYSING MEDIA COVERAGE

ITEM. RN(4)

I. ID INFO
  1. PAPER NAME
  2. DATE YR-DATE FORMAT 'MM/DD/YY'
  3. PAGE.
  4. SECTION.
  5. COLUMN INCHES
  6. PICTURE
  7. PICTURE COLUMN INCHES
  8. TYPE OF ITEM

II. CONTENT
  1. SUBJECT
    a. ACADEMICS
      i. PROGRAMS
      ii. CONTINUING EDUCATION
      iii. COOPERATIVE EDUCATION
      iv. ACADEMIC SUPPORT SERVICES
    b. SERVICES
      i. STUDENT SERVICES
      ii. COMMUNITY SERVICE PROGRAMS
      iii. STUDENT HOUSING
    c. ADMINISTRATION OR BOARD
      i. POLICIES PLANS ACTIONS
      ii. FINANCES
    d. INDIVIDUALS
      i. PRESIDENT
      ii. EXECUTIVE STAFF
      iii. ADMINISTRATIVE STAFF
      iv. FACULTY
      v. SUPPORT STAFF
      vi. STUDENTS
    e. UNIONS ASSOCIATIONS TEAMS CLUBS
      i. FACULTY UNION
      ii. CSEA
      iii. ADMINISTRATIVE & EXECUTIVE STAFF
      iv. FACULTY STUDENT ASSOCIATION
      v. STUDENT CLUBS
      vi. ATHLETIC TEAMS
    f. OTHER
      i. UNPLANNED INCIDENTS
      ii. OTHER

III. IMPRESSION
  1. HEADLINE
  2. PICTURE
  3. 1ST PARAGRAPH
  4. REMAINDER
  5. OVERALL

# CREATING AN ASSESSMENT PLAN FOR A DEVELOPMENTAL STUDIES UNIT

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## INTRODUCTION

An evaluation plan for any educational program looks at two components of that program to measure its success. The first component is the impact of program activities on the success of a student within the program. The second component looks at the success of students over time after they leave the program.

As part of a year-long evaluation of the Developmental Studies Program (DSU) at Schenectady County Community College, an assessment plan was prepared to look at the second component, that is, to demonstrate the success of students who have been enrolled in Developmental Studies courses as they continued their education to graduation.

To do this, the study focused on the retention of these students from semester to semester, and the rate of graduation, as compared to students who have not been involved in the Developmental Studies program. These rates were further broken down by specific characteristics of the students, such as age, gender, and ethnicity. A secondary outcome measure, success in Freshman English, was also examined.

This paper will describe the results from this investigation using the entering Freshman class of 1984 as the example group. It will also point out some of the effects from the process of assessing a group of

students using outcomes measures. The model of student flow is not hard to elaborate, using the traditional entry points and exit points, such as enrollment, attrition, and graduation. However, the information needed to support such a model is rarely available in a form that can be readily used. The experiences at Schenctady are meant to illustrate the types of problems encountered, and the decisions that should be made in advance to cope with these problems.

## METHOD OF ASSESSMENT

The method of assessment focused on tracking a specific cohort over time to separation from the college either through graduation or withdrawal.

### Population

The cohort to be tracked was defined as one entry class, in this case the class that entered in the Fall of 1984. This group was chosen to provide enough semesters for completion of the degree, under the assumption that students needing remedial work take additional semesters to complete their coursework.

For this group, a Developmental Studies student was defined as one who registered for at least six credits of developmental studies classes. At Schenectady County Community College, there are four areas of remedial coursework: reading, writing, language arts, and mathematics. For the purposes of this study, students who were enrolled in reading and writing were followed. The six credit requirement was established because so many of the students register for the remedial writing class alone, whether they were recommended through entrance level testing or not. By adding the reading course, we were better able to establish a population that needed a full range of remedial work.

Though this cohort definition seems simple enough, it engendered a great deal of misunderstanding as the study proceeded. The cohort was defined as first-time full-time students. However, not all students in the Fall, 1984 courses were first-time, even when only the first courses for reading and writing were included. Thus, the teaching staff kept producing lists of students that were on their class rosters that could not be identified through the master files as being first-time students for that file. This resulted in rechecking these additional students over and over until the faculty accepted that they didn't belong in the cohort. At one point the entire validity of the study was questioned until the faculty member realized that her class roster count did not have to match the count of students identified for the study.

Variables of Interest

Once the requirements for inclusion were established, a list of variables to be investigated was generated. Of course, the number of semesters attended and the graduation rate were the primary outcomes measures. These variables were looked at for the group as a whole, and then in conjunction with a set of variables such as gender, ethnic identity, EOP status, and performance in Freshman English. These variables were not selected because they were the ideal variables necessarily, but because they were the variables available for this group.

Tools Needed to Conduct the Assessment

The initial idea of tracking the students seemed eminently practical because the identifying information was maintained on a student master file. This student master file contained information about selected student characteristics, and about the student's progress from semester to semester, including GPA and number of credits taken. However, the records of the

the students' performance in DSU courses were maintained on a completely different system, which had no interface capabilities with the master file records. Thus, the model of student flow was easy to devise, but the records of individual student performance within a DSU course had to be attached to the model by hand. This necessitated the creation of a third file containing elements from both the course files and the master files. This third file was maintained on a micro-computer because neither the mainframe nor the mini-computer maintained adequate software for analysis.

The problem was compounded by some peculiarities of each of the machines and files involved. For instance, initially it was thought that the files between the systems could be translated. However, the input file maintained for the course records, which used social security numbers as identifiers, only permiited a field that was six characters wide. This limitation was not specified in any of the documentation about the software, and was unknown to the computer staff. The nine digit numbers appeared intact on the screen, but internally were truncated to six digits. Thus, when these numebers were matched to the master file, very few matches were found. The first assumption was that grievous errors had been made in the input file. It was not until the nine digit number was broken apart into two numbers that we discovered that the truncation was occuring.

Problems like this result from the fact that in a limited computing environment classroom data beyond student ID and final grade is not maintained beyond handwritten lists or micro-computer files. The tools used were not originally designed to facilitate an assessment model of student progress. Though the variables to be measured are obvious, the supporting information is only available by recoding handkept records.

At SCCC, the information from both files was merged and recoded by hand, and then entered into a separate system which maintained the needed software to aggregate the data.

## RESULTS

The results presented here are based on the recording system described above. They indicate that DSU students are less likely than other students to persist to graduation. Not only does it take them longer to reach graduation, but after five semesters a greater percentage of them had withdrawn from the college.

These results are consistent with findings at other community colleges, as expressed as part of a workshop held at SCCC in the Spring of 1987[1]. The following tables show some of the information that was obtained about the retention pattern of these students. Table 1 shows the retention rates for all students who entered as first-time, full-time students in Fall, 1984. Table 2 shows the retention rates for those students who were enrolled in both reading and writing remedial courses during that semester.

TABLE 1
RETENTION OF FALL, 1984 ENTERING STUDENTS

| | FULL TIME | | | | | |
|---|---|---|---|---|---|---|
| | ENROLLED | | GRADUATED | | WITHDRAWN | |
| SEMESTER | n | % | n | % | n | % |
| Fall, 1984 | 428 | 100 | 0 | 0 | 0 | 0 |
| Spring, 1985 | 421 | 80 | 0 | 0 | 107 | 20 |
| Fall, 1985 | 298 | 56 | 9 | 2 | 221 | 42 |
| Spring, 1986 | 233 | 44 | 23 | 4 | 272 | 52 |
| Fall, 1986 | 68 | 13 | 122 | 32 | 338 | 64 |

For span covered: 23% graduated in 5 semesters or less
64% withdrew
13% persisted through at least 5 semesters

[1]On March 27, 1987, a Faculty Intercampus Program Exchange (FIPE) was held on campus, coordinated through the DSU and LaVerna M. Fadale, representing the Two Year College Development Center of the State University of New York. Seven community colleges were represented at this FIPE, whose purpose was to exchange ideas about the evaluation of Developmental Studies Programs in general, and at SCCC in particular.

TABLE 2

RETENTION OF FALL 1984 ENTERING STUDENTS
FULL-TIME
ENROLLED IN READING AND WRITING

| SEMESTER | STATUS | | | | | |
|---|---|---|---|---|---|---|
| | ENROLLED | | GRADUATED | | WITHDRAWN | |
| | n | % | n | % | n | % |
| Fall, 1984 | 62 | 100 | 0 | 0 | 0 | 0 |
| Spring, 1985 | 39 | 63 | 0 | 0 | 23 | 37 |
| Fall, 1986 | 21 | 34 | 0 | 0 | 41 | 66 |
| Spring, 1986 | 15 | 24 | 1 | 2 | 46 | 74 |
| Fall, 1986 | 4 | 6 | 1 | 2 | 57 | 92 |

For span covered: 2% graduated
92% withdrew
6% persisted through at least 5 semesters

Though these results were to be expected, they became more disturbing to the DSU faculty as they were elaborated. For example, the relationship between the number of terms a student persists and the grade earned in reading, the most basic remedial class, is not very clearcut. For example, as shown in Table 3, six of the students who persisted for four semesters had failed the reading course. The assumption that college work cannot be completed without this basic level of skill is not demonstrated by these figures.

TABLE 3

PASS/FAIL RATE OF STUDENTS ENROLLED FALL 1984 FULL-TIME ENROLLED IN READING AND WRITING

(n = 62)

| TERMS ATTENDED SCCC | GRADE EARNED IN READING | | | |
|---|---|---|---|---|
| | PASS | FAIL | Fx | WITHDRAWN |
| 1 | 5 | 4 | 6 | 8 |
| 2 | 9 | 6 | 3 | 0 |
| 3 | 3 | 1 | 2 | 0 |
| 4 | 4 | 6 | 1 | 0 |
| 5 | 3 | 1 | 0 | 0 |
| TOTAL | 24 | 18 | 12 | 8 |

1 person graduated: earned P in writing, F in reading, persisted 4 semesters to graduation

The comparison between grades earned in the remedial writing class and grades earned in Freshman English also showed that about 10% of the students who failed or withdrew from remedial writing were able to pass Freshman English.

Assumptions about the characteristics of the students in remedial classes were also not born out. In general, there were almost as many women as men in the classes. The percentage of minorities was representative of the college as a whole, as was the number of EOP students. Thus, the students in these classes were not radically different in basic characteristics from the rest of the community college students. In addition, the assumptions that gender plays a role in language ability was not born out by the crude measure of pass or fail rates. There were slightly more male students in the classes, but their pass rates were remarkably similar to those of the female students.

The problem with producing these results is that there were no formal expectations for appropriate percentages. Though it was generally felt that the attrition rate was typical of Developmental Studies students, there was no benchmark to compare it against. The same held true for looking at the identifying characteristics of the students, and their pass rates. Though the informati produced was interesting, there was no measure to show whether this was usual for this college, or for community colleges in this area. The reported rates of attrition vary greatly from institution to institution within the State University of New York system, and are rarely reported for one particular sub-group of students.

## DISCUSSION

As might be expected, the problems experienced in consolidating the information available about students into a format that can be used for assessment purposes has focused the college on the integration of the various computer systems. An office automation project has been proposed that would link the master files with three local area networks, including one that encompasses the Institutional Research Office. In addition, the translation problems experienced between the master files and the course records have been addressed. The mini-computer that handles academic computing has been upgraded, and methods for transferring information have been added.

This single study was not the only reason that these changes took place. However, it provided a focus for describing the needed changes, and for networking work stations that might not normally have been included.

The problem of appropriate and reasonable expectations for retention and attrition rates is not as easily addressed. Expanding the study to

look at all students, and than at students in particular types of degree programs is desirable. However, high attrition rates in certain programs cause departments to be cautious about this type of investigation when there are no previously defined comparison points. For those undertaking this type of assessment study, it is important to work with the recipients of the study results to provide a context for attrition rates. One way that this will be addressed at Schenectady is through a series of student surveys, including student opinion surveys, surveys of graduates, and surveys of those who withdraw. These surveys will include mailed survey forms and telephone interviews. Through this method, the expectations of the students, and their goals for degree completion, will be examined. With this information, the actual attrition rates can be used as gauges of student satisfaction and success.

# STUDENT RETENTION AT A NON-RESIDENTIAL UNIVERSITY

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## I. INTRODUCTION

Most retention research has focused on residential colleges with traditional-aged student populations. The present paper fills a gap in our understanding of student retention by presenting baseline retention information from an urban commuter university with sizeable numbers of minority and older students - the University of Massachusetts at Boston.

The central questions addressed in this report are:

1) What is the retention rate of students at UMass/Boston?
2) How has the retention rate changed over time?
3) What variables are most strongly associated with student retention?

Our study is based not on a sample, but the entire population of 26,483 undergraduate degree-seeking students enrolled at the UMass/Boston Harbor Campus in any spring or fall semester between fall 1981 and spring 1987. We begin in fall 1981 because reliable data prior to that time are not available. (One of the academic units of the University is the College of Public and Community Service which has a competency-based rather than a course-based curriculum. This College is not included in the data analyzed in the present paper.) For the Harbor Campus "enroll" is defined as officially registered for a course at the end of a semester's add/drop period.

We use two measures of the retention rate. The first measure is "cohort survival" which is the percentage of an original identified cohort of entering students that is enrolled in or has graduated by a subsequent specified semester. The second measure is "semester return" which is the percentage of students completing a semester who enroll in the next semester. "Cohort survival" follows a selected population of students over time and includes students who return after an absence, while "semester return" presents snapshots of students of selected characteristics at different times. The latter measure enables us to compare retention rates even when sub-population sizes are small or time span is limited.

## II. OVERVIEW

The University of Massachusetts at Boston is a 100% commuter institution enrolling a diverse undergraduate student population: 18% are minority, 56% are women, the median age is 22.8 years. The proportion of students entering with prior college experience is growing, and reached 62% in fall, 1986. Transfer students enter at all grade-years, from the freshman year through to the senior year. For this reason, the cohort analysis of retention patterns of "native" freshmen (those who enter with no prior college experience) is conducted separately from that of transfer students. When the two groups of entering students are combined, however, we estimate that about 37% of all students who enter Harbor Campus programs eventually graduate.

### A. COHORT SURVIVAL OF FIRST-TIME FRESHMEN

Table 1 shows the cohort survival of first-time freshmen entering UMass/Boston since the fall of 1981. In the two fall cohorts we have been able to follow for five years, the graduation rate has been 22.2% and 19.2% with another 10% in each cohort still taking classes. We, therefore, project that 30% of incoming first-time freshmen will eventually receive UMass/Boston degrees.

Table 1

COHORT SURVIVAL OF FIRST-TIME FRESHMEN, FALL 1981 - SPRING 1987
(% ENROLLED AND % GRADUATED IN SUBSEQUENT SEMESTERS)

| Entering Semester | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fall '81 (913) | 100 | 85.5 | 60.7 | 56.3 | 46.0 | 42.3 | 37.7 | 25.5 | 21.3 | 10.0 | 9.1 | 3.8 |
| | | | | | | | Graduated | 9.8 | 12.7 | 22.2 | 23.2 | 27.2 |
| Spring '82 (177) | 100 | 62.2 | 55.4 | 40.0 | 32.8 | 25.4 | 24.9 | 20.3 | 15.3 | 9.6 | 5.6 | |
| | | | | | | | Graduated | 4.5 | 8.5 | 11.9 | 15.8 | |
| Fall '82 (960) | 100 | 86.2 | 65.3 | 55.8 | 43.7 | 40.7 | 36.2 | 26.0 | 21.7 | 10.8 | | |
| | | | | | | | Graduated | 7.0 | 9.6 | 19.2 | | |
| Spring '83 (251) | 100 | 68.9 | 55.8 | 46.2 | 41.8 | 35.4 | 30.7 | 17.5 | 16.7 | | | |
| | | | | | | | Graduated | 6.0 | 10.4 | | | |
| Fall '83 (1168) | 100 | 83.1 | 62.2 | 56.3 | 43.8 | 37.9 | 34.5 | 23.4 | | | | |
| | | | | | | | Graduated | 8.1 | | | | |
| Spring '84 (227) | 100 | 74.9 | 62.1 | 46.7 | 41.0 | 33.9 | 31.2 | | | | | |
| Fall '84 (908) | 100 | 81.3 | 61.8 | 54.8 | 48.0 | 42.6 | | | | | | |
| Spring '85 (194) | 100 | 71.1 | 53.1 | 45.4 | 39.2 | | | | | | | |
| Fall '85 (919) | 100 | 82.3 | 63.5 | 56.7 | | | | | | | | |
| Spring '86 (227) | 100 | 69.6 | 57.3 | | | | | | | | | |
| Fall '86 (993) | 100 | 80.7 | | | | | | | | | | |
| Spring '87 (266) | 100 | | | | | | | | | | | |

A recent review of student retention studies states that 53% of first-time freshmen who enter four-year public universities graduate within five years (Terenzini, 1987). There is, however, well-documented evidence that commuting students have lower retention rates than residential students (Chickering, 1974; Astin, 1980; Beal and Noel, 1980). In addition, there is substantial research that shows that many of the factors usually associated with a commuting institution, such as part-time academic status and half-time or more employment, are also related to lower retention rates (Smith, Prather and Hand, 1987; Bean and Plascak, 1987). This research suggests that non-residential universities will have substantially lower retention rates than residential universities, but there is no reliable national information on retention at non-residential universities. We, therefore, cannot say whether the UMass/Boston five year graduation rate of 20% and ultimate graduation rate of 30% is better or worse than that of comparable institutions. Clearly the graduation rate is not good, but

given the 100% commuting population and the many part-time students, this low graduation rate is not surprising. A series of reports produced by the UMass/Boston Center for Survey Research (CSR) based on a sample of 1982 freshmen provide important information on students who leave the University. The third-year CSR study (March, 1986) reported that 50% of the students who left UMass/Boston were enrolled at another university. Many of these students may have entered UMass/Boston with goals other than a UMass/Boston degree. We should be careful to avoid equating institutional retention with individual success (Terinzini, 1987).

There has been no noticeable improvement in first-time freshmen retention from the cohort entering UMass/Boston in the fall 1981 to the cohort entering in fall 1986. As Table 1 shows, there has been a very consistent cohort retention pattern over the past six years.

There is a clear division between students who start in the fall and students who start in the spring. The difference in fall and spring starters' retention begins with the large attrition over the first summer, which immediately effects spring freshmen starters. Only 69% of first-time freshmen who start in the spring come back in the fall, compared to 83.4% of fall starters enrolling in their second semester. Even after the fall cohorts have been reduced by their first summer attrition, the fall cohorts stay above spring cohorts at all subsequent semester points. It might have been thought that spring cohorts suffer attrition sooner and then approximate fall cohort patterns, but this does not happen. Figure 1 shows that spring cohorts have lower long-term retention rates, with a curve lower than, but paralleling in shape the retention curve of the fall cohorts.

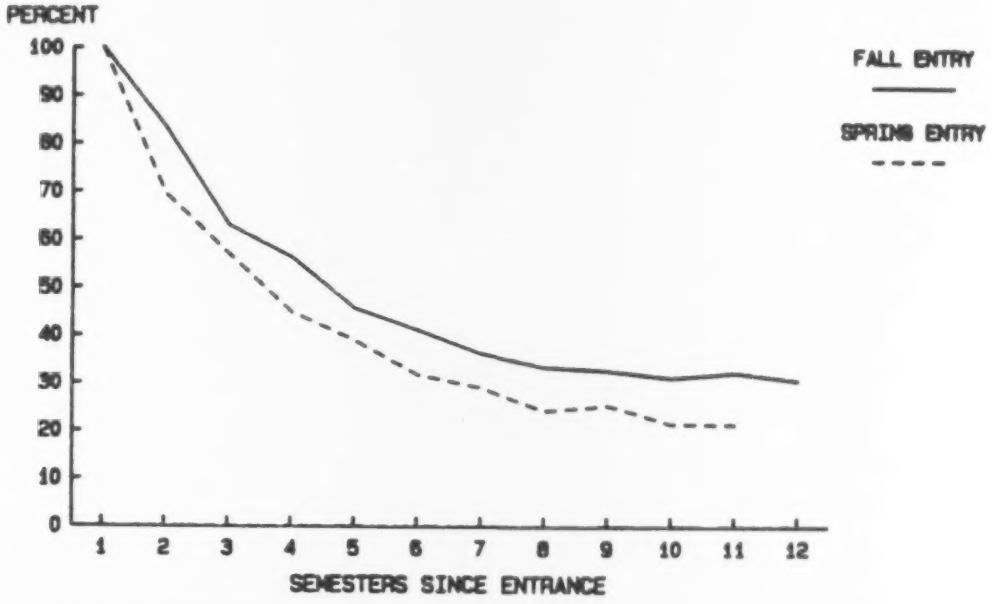
For first-time freshmen cohorts, attrition is sharpest in the first two semesters, and continues to decline in a linear pattern until the sixth semester when the curve flattens out. Only 60% of all entering freshmen are still enrolled in the third semester, with fall cohorts having a cohort average of 62.6% and spring cohorts 56.7%. National findings show that the freshmen year is the time of most loss (Terenzini, 1987), but the figure for all four-year public universities is 70% retention, compared to our finding of 60%. Again, we have a UMass/Boston retention rate lower than national norms, but with no information on comparable non-residential universities.

B. SEMESTER RETURN RATES

The fall to spring semester return for all matriculated students since 1981 has been 87.8%, 89.4%, 86.2%, 88.1%, 85.9% and 87.0% for a semester average of 87.4%. This is the percentage of students completing a fall semester without graduating who enroll in the spring semester of that academic year. This percentage has remained stable since 1981 (see Table 2).

Figure 1

COHORT SURVIVAL OF FIRST-TIME FRESHMEN
PERCENT ENROLLED OR GRADUATED
FALL VS. SPRING ENTRY - 6 YEAR AVERAGE




NOTE: EACH COHORT IS FOLLOWED FROM THE SEMESTER OF ENTRANCE THROUGH THE SPRING OF 1987.

The spring to fall semester return since 1981 has been 79.1%, 78.7%, 78.7%, 78.5% and 80.8% for a semester average of 79.2%. The 1986 figure reflects an increase from the level of the previous three years. Retention over the summer is, thus, about 10 percentage points lower than retention during the academic year. It is not surprising that students leave more during the summer than during the academic year, and what is of note is the relative stability of the summer retention over time compared with the fluctuation in mid-year retention.

When we compare students who are at different grade levels, those in their freshman year (all students with fewer than 30 accumulated credits) have distinctly lower return rates than the three upper grade levels, and the difference between freshmen and upperclass return is much greater over the summer than during the academic year. Spring to fall return of those still in their freshman year has fluctuated quite widely with a semester average of 69.3%, about 10 percentage points lower than the semester averages for the upperclasses. Mid-year freshmen return has averaged 82.1% without much variation, about 6 percentage points lower than upperclass return. Freshmen mid-year return has not improved in the last six years, but there has been an improvement in freshmen spring to fall semester return from 68.0% in 1981 to 73.9% in 1986. Clearly the period with most attrition is the freshmen summer and special care must be taken to influence retention at this point.

Table 2

SEMESTER RETURN, FALL 1981 - FALL 1986
TOTAL AND BY GRADE YEAR

| Semester | Freshman | | Sophomore | | Junior | | Senior | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number Compl. | % Returning Next Semester | Number Compl. | % Returning Next Semester | Number Compl. | % Returning Next Semester | Number Compl. | % Returning Next Semester | Number Compl. | % Returning Next Semester |
| Fall '81 | 1965 | 84.1 | 1903 | 87.8 | 1851 | 89.2 | 1785 | 90.6 | 7504 | 87.8 |
| Spring '82 | 1537 | 68.0 | 1717 | 78.1 | 1812 | 84.8 | 1451 | 84.8 | 6517 | 79.1 |
| Fall '82 | 1938 | 83.2 | 1748 | 90.2 | 1717 | 92.4 | 1858 | 92.4 | 7261 | 89.4 |
| Spring '83 | 1584 | 63.4 | 1592 | 80.1 | 1707 | 86.6 | 1690 | 83.8 | 6573 | 78.7 |
| Fall '83 | 1891 | 80.8 | 1661 | 85.1 | 1802 | 89.1 | 2051 | 89.6 | 7405 | 86.2 |
| Spring '84 | 1496 | 71.2 | 1506 | 77.4 | 1750 | 83.3 | 1598 | 81.9 | 6350 | 78.7 |
| Fall '84 | 1699 | 81.0 | 1730 | 89.2 | 1689 | 91.6 | 1959 | 90.4 | 7085 | 88.1 |
| Spring '85 | 1330 | 70.1 | 1691 | 79.1 | 1713 | 82.1 | 1615 | 81.0 | 6349 | 78.5 |
| Fall '85 | 1500 | 81.4 | 1837 | 85.5 | 1832 | 88.5 | 1917 | 87.4 | 7126 | 85.9 |
| Spring '86 | 1291 | 73.9 | 1653 | 81.4 | 1813 | 84.0 | 1544 | 82.1 | 6301 | 80.8 |
| Fall '86 | 1697 | 82.2 | 1928 | 87.0 | 1986 | 89.1 | 1890 | 88.9 | 7501 | 87.0 |
| Semester Average | | | | | | | | | | |
| Fall | | 82.1 | | 87.5 | | 90.0 | | 88.4 | | 87.4 |
| Spring | | 69.3 | | 79.2 | | 84.2 | | 82.7 | | 79.2 |

In addition to the freshman-year pattern, the most interesting finding arising from the grade level data is that seniors have lower semester return rates than juniors. Although the differences are not great we would expect to find retention greater as students proceed through their college career, because of the combination of increased investment and proximity to a goal.

C. IDENTIFICATION OF INFLUENTIAL FACTORS

Multivariate statistical techniques enable us to uncover the relationship between a dependent variable, in our case retention, and any number of independent variables theoretically influencing retention. We have used stepwise linear regression in order to show how each of the following variables affects retention once we take the other variables into account: age, sex, race/ethnicity, college, transfer or first-time (native) UMass/Boston student, grade level, full-time or part-time course load, and cumulative grade point average. (We have corroborated our linear regression findings with other multivariate procedures, but present only the linear regression findings because the similarity of results among the different procedures leads us to present the multivariate analysis which is most familiar to readers.)

Several critical points are shown by the regression analysis:

1) GPA at UMass/Boston has by far the strongest relationship to retention of any of our variables. GPA is four times more important than the other variables in our model, accounting for 72% of the explained variance in retention. This is consistent with national studies which have emphasized the critical importance of GPA on student retention, especially among commuter students (Tinto, 1975; Pascarella and Chapman, 1983; Bean, 1985).

2) Full-time course load has a relatively small, but consistently positive, relationship with retention. About 19% of the explained variance in retention is accounted for by a student taking a full-time course load in the semester, independent of other factors. Again, this is in keeping with the findings of other retention studies (Smith, Prather and Hand, 1987; Bean and Plascak, 1987).

3) As much as 22% of freshman-year retention is explained by the variables in our model, whereas upperclass retention is not as well explained by these variables. The relative importance of GPA and full-time status remains the same for freshmen as for all students. Freshman-year retention is more related to the variables which we can measure, whereas upperclass retention may be more influenced by personal or non-academic considerations.

4) Entry mode has a small but consistent relation with retention. Native students have higher retention rates than transfer students, a pattern found in the Center for Survey Research study of a sample of the 1982 freshmen class, and in much national research (Louis and Potter, 1986; Cohen and Brawer, 1982; Graham, 1987).

5) Controlling for other variables, minority status is positively related to fall to spring return, that is, holding other variables constant racial/ethnic minorities have higher fall to spring return rates than whites, and the two groups have no difference in spring to fall return rates. The direct effect of race/ethnicity is insignificant, however, when compared to the direct effect of GPA and full-time status.

6) Controlling for the other variables, women have higher retention rates than men, and younger students have higher retention rates than older students.

Academic factors - especially GPA and full-time status - have a stronger direct influence on retention than demographic factors such as age, sex, and race/ethnicity. Age, sex and race/ethnicity are associated with retention when looked at in a simple bivariate table, but this association usually is explained by the demographic variable's association with academic factors which in turn influence retention.

## III. ACADEMIC FACTORS

### A. CUMULATIVE GRADE POINT AVERAGE

Among the variables we can measure,the strongest correlate with retention at UMass/Boston is the cumulative grade point average of the student. Students with GPAs above 2.00 have a 30 percentage point higher summer rate of return to the University than students with GPAs below 2.00. Table 3 and Figure 2 show that students below 2.00 have an average of only 54.5% return from spring to fall, compared to 83.5% for students between 2.00 and 2.74, 85.0% for students between 2.75 and 3.49, and 86.0% for students above 3.50. These figures make clear that the great divide is at the 2.00 level, and that there is no substantial difference between the retention of students with excellent GPAs and students with average GPAs. The same pattern holds for mid-year return with low GPA students averaging 70.3% return compared to about 90% for the other students.

Is it possible that although GPA in general has a positive relation to retention, at certain transfer points, such as the sophomore year, students with high GPAs may be in strong market positions and transfer to universities they may not have considered before their experiences at UMass/Boston? This is not, on the average, the case at UMass/Boston. At all class levels the high GPA students are more likely to stay than are the low GPA students. At the sophomore level, students below 2.00 have about a 70% retention rate (although there is great fluctuation here) while higher GPA students have a 90% retention rate. Junior retention is the same and even in the senior year, where it might be imagined that students with marginal GPAs had some exceptional stake in the University in order to persist in the face of low academic achievement, the low GPA students have about the same 70% to 90% relationship to the other students.

### B. FULL-TIME VERSUS PART-TIME STATUS

Multivariate analysis has shown that next to Grade Point Average the strongest correlate of retention is the number of credits a student takes in a semester. Students with part-time status in a semester, 11 or fewer

credits by our definition, have about a 10 percentage point lower rate of return in the next semester than do students carrying 12 or more credits. Table 4 shows this difference to be equally strong and stable for both spring and fall semesters since 1981. The student who takes a part-time load is probably more vulnerable to financial and personal changes or pressures which prevent the person from continuing to enroll.

Table 3

SEMESTER RETURN, FALL 1981 - FALL 1986
BY CUMULATIVE GRADE POINT AVERAGE

| Semester | <1.99 | | 2.00-2.74 | | 2.75-3.49 | | 3.50+ | |
|---|---|---|---|---|---|---|---|---|
| | Number Compl. | % Returning Next Semester | Number Compl. | % Returning Next Semester | Number Compl. | % Returning Next Semester | Number Compl. | % Returning Next Semester |
| Fall'81 | 1420 | 69.2 | 2641 | 91.2 | 2490 | 92.5 | 953 | 94.2 |
| Spring '82 | 1217 | 56.6 | 2658 | 82.5 | 2161 | 84.5 | 829 | 86.1 |
| Fall '82 | 1387 | 76.5 | 3712 | 91.8 | 2658 | 93.5 | 912 | 93.2 |
| Spring '83 | 1301 | 52.0 | 3592 | 84.7 | 2414 | 85.5 | 742 | 87.1 |
| Fall '83 | 1324 | 65.5 | 4644 | 90.8 | 3030 | 91.8 | 955 | 92.1 |
| Spring '84 | 1097 | 54.1 | 4329 | 83.8 | 2658 | 83.9 | 780 | 84.0 |
| Fall '84 | 1185 | 74.9 | 2537 | 88.5 | 2410 | 92.2 | 953 | 93.5 |
| Spring '85 | 1114 | 50.2 | 2264 | 83.1 | 2127 | 85.5 | 844 | 86.0 |
| Fall '85 | 1102 | 65.4 | 2451 | 87.2 | 2516 | 91.2 | 1057 | 91.4 |
| Spring '86 | 996 | 59.5 | 2163 | 83.4 | 2253 | 85.4 | 889 | 86.7 |
| Fall '86 | 1140 | 70.3 | 2501 | 88.7 | 2691 | 90.8 | 1169 | 90.8 |
| Semester Average | | | | | | | | |
| Fall | | 70.3 | | 89.7 | | 92.0 | | 92.5 |
| Spring | | 54.5 | | 83.5 | | 85.0 | | 86.0 |

Figure 2

SPRING TO FALL SEMESTER RETURN, 1981 - 1986
BY CUMULATIVE GRADE POINT AVERAGE

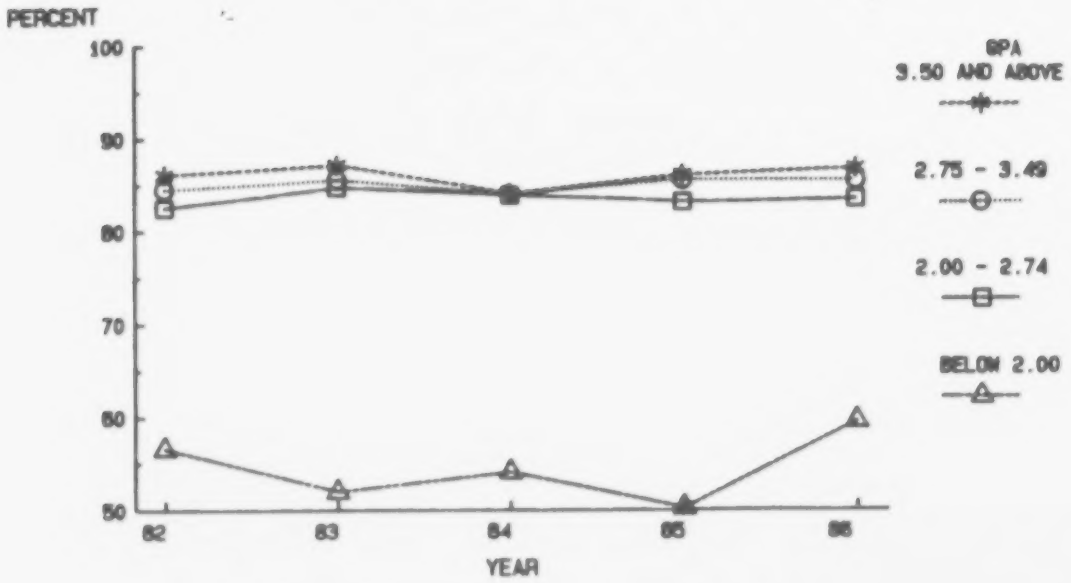



Table 4

SEMESTER RETURN, FALL 1981 - FALL 1986
BY PART-TIME - FULL-TIME STATUS

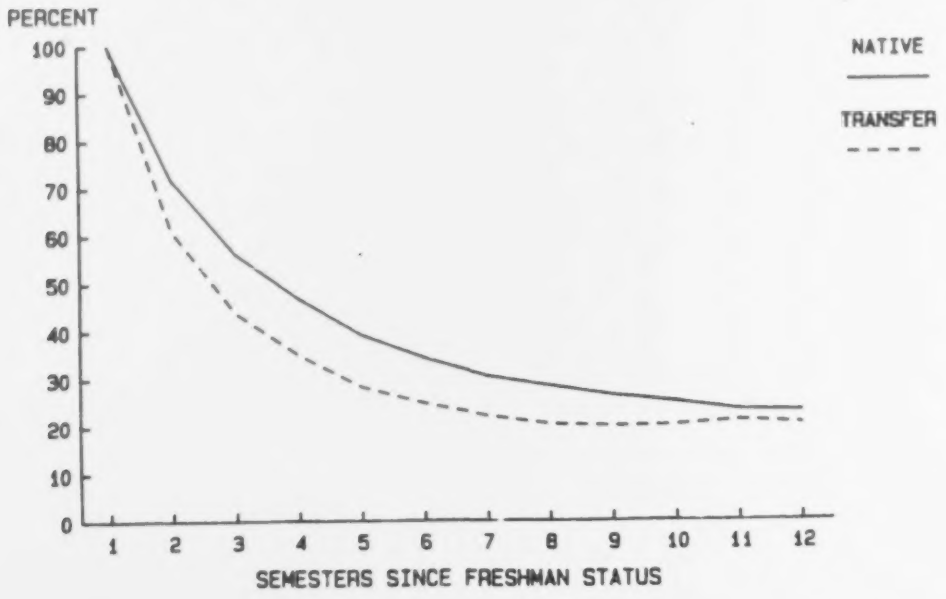
| Semester | 11 or Fewer Credits | | 12 or More Credits | |
|---|---|---|---|---|
| | Number Compl. | % Returning Next Semester | Number Compl. | % Returning Next Semester |
| Fall '81 | 2377 | 79.8 | 5127 | 91.6 |
| Spring '82 | 2177 | 73.0 | 4340 | 82.1 |
| Fall '82 | 3083 | 84.6 | 4178 | 93.0 |
| Spring '83 | 3076 | 73.7 | 3497 | 83.2 |
| Fall '83 | 3160 | 79.3 | 4245 | 91.3 |
| Spring '84 | 3181 | 76.9 | 3169 | 80.5 |
| Fall '84 | 3087 | 82.0 | 3998 | 92.9 |
| Spring '85 | 2979 | 72.4 | 3370 | 83.9 |
| Fall '85 | 3151 | 79.7 | 3975 | 90.8 |
| Spring '86 | 2943 | 75.8 | 3358 | 85.1 |
| Fall '86 | 3425 | 81.1 | 4076 | 91.9 |

C. TRANSFER VS. NATIVE STUDENTS

In order to compare transfer careers with first-time freshmen careers, we have first selected for each of the twelve semesters for which we have data the cohorts of transfer students and first-time freshmen who had accumulated fewer than thirty credits. These transfer freshmen and native freshmen are then followed over time and their differing cohort survival patterns compared. For these cohorts of freshmen, native students have higher retention rates than transfer students. However, as Figure 3 shows, the difference between native and transfer survival rates increases for the first few semesters and then begins to decrease. For example, the fourth semester retention rate for natives has averaged 51.2% compared to 41.4% for transfers, but by the tenth semester the graduation rate for the 1981 and 1982 native fall cohorts was 16.9% and 17.1%, compared to 16.5% and 14.8% for the transfer cohorts. Thus, we see that freshman-transfer retention initially is substantially lower than freshman-native retention, but transfer students have almost the same graduation rates as native students.

Figure 3

COHORT SURVIVAL OF TRANSFER AND NATIVE STUDENTS
WITH FRESHMAN STATUS
PERCENT ENROLLED OR GRADUATED - 6 YEAR AVERAGE



Continuing this comparison of transfer students and native students, we selected all students who had between 30 and 59 credits, dividing them into students who were transfers and students who had started at UMass/Boston. Would the pattern we had found among transfer freshmen and first-time freshmen hold for students who had arrived at sophomore status? Our data show that there is little difference in the subsequent enrollment and graduation of sophomore level students of different entry modes. The native students have an initially higher retention rate in the first two or three semesters, but the transfer students catch up and pull even by the time of graduation. Presumably, native sophomores have already been selected out of the vulnerable pool of native freshmen, while the transfer sophomore cohorts still need a "shake down" period. This finding is consistent with the results of a recent study at a public, residential university that suggested that transfer students have lower retention rates than native students in the first two or three semesters after entrance, but that those transfer students remaining for the third semester are just as likely to persist as the native students (Graham, 1987).

Another way of comparing the retention of native and transfer students is to compare the eventual graduation rate of students at different grade levels who have different entry modes. For the 1981 to 1983 fall cohorts, native students had higher graduation rates than transfer students in eleven out of twelve instances. The difference is consistent across grade levels. For example, 39.7% of fall 1981 transfer sophomores had graduated by spring 1987 compared to 43.6% of native sophomores, while 89.4% of fall 1981 senior transfers had graduated by spring 1987 compared to 91.7% of senior natives.

This analysis also provided the likelihood of graduating for both transfer and native students once a student has accumulated a certain number of credits, with 20% of freshmen graduating, 40% of the students able to persist into the sophomore level eventually graduating, 65-70% of juniors and 90% of seniors. It is interesting that 10% of 1981 seniors had not graduated by spring 1987. Along with the vulnerable freshman, the senior who never finishes a degree is an important subject for further research.

In sum, freshman year is a tough one for first-time freshmen at UMass/Boston with many not returning, but those that do persist into the sophomore year have from that time on better retention and higher graduation rates than incoming transfer students. Similarly, the first two semesters for incoming transfers are times of high attrition, but after that the transfer students have only slightly lower retention rates than the native students. Both transfer and native cohorts have some members who do not stay very long and other students who make it through the initial difficult period. These early-semester transfer and native persisters then have similar retention rates.

## IV. CONCLUSION AND RESEARCH DIRECTIONS

Our analysis of UMass/Boston student retention supports the growing body of research which emphasizes the importance of academic integration at commuter institutions. Rather than throw out the prevailing residential-college-based model of student retention with its emphasis on social integration, the lesson learned from commuter institutions may be that we must consider external social ties as well as internal social integration. The support of family members and work colleagues influences the non-traditional student's ability to make the commitment necessary for academic success. The lessons learned from non-residential universities point the way towards a broader model of student retention, appropriate not just for these institutions but for all institutions confronted with larger percentages of "non-traditional" students.

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# A COMPREHENSIVE MULTIDIMENSIONAL APPROACH TO OUTCOMES RESEARCH

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## INTRODUCTION

Outcomes assessment at the University of Delaware was begun in the late sixties as an outgrowth of the University's community design program for the decade of the seventies. Through the years, outcomes assessment became more detailed and sophisticated after the implementation of a computerized Student Records System in 1973. Computer programs were developed by senior programmer analysts who, working with other professionals in the institutional research office, recognized the need for outcomes assessment for planning purposes. Because the University has been involved in this type of research for many years, trend data are readily available. Longitudinal comparisons are possible and are useful in developing projections required in managing the University. A recent purpose of outcome studies has been to assist in the evaluation of programs developed for the purpose of improving retention and graduation rates.

## RETENTION/ATTRITION STUDIES

Each entering class of new freshmen is tracked beginning with the fall following entrance. Students are categorized according to whether they were dropped for academic reasons, withdrew failing, withdrew passing or were

continuing at the University. (Table 1). Academic indicators, such as SAT scores, predicted-grade-indices and grade-point-averages for these students are compared. Attrition beyond the first year and graduation rates are determined, also (Table 2). Comparisons may be made among various groups of students according to gender, race, residence status, college of entrance or predicted-grade-index intervals.

In order to learn more about why students left the University, a total of 1300 students were polled in Fall 1985 and Fall 1986, with a resulting response rate of 42 percent. The focus of the study is on notable differences in responses given by various subgroups such as in-state and out-of-state students or responses of students by class level.

Although almost 90 percent of the nonresidents were continuing their education elsewhere, only about 40 percent of the in-state students were doing so. Half of the Delawareans were employed full-time (Table 3). The main reason for leaving was program-related for more than a third of the sophomores who left, whereas one in five of the former juniors left because they were unsure of their academic goals. One in five freshmen indicated that they did not have enough money to continue (Table 4). Students enrolled in different curriculum areas of the University responded in varying proportions as the main reason why they left. It is important to examine results of this type of survey by various curriculum groups if adequate programs are to be developed to address retention issues.

Table 1

First-year Attrition Among New Freshmen by College/Discipline
Academic Years 1976 - 1985

| | Entrants Fall Term | Total Freshmen % | Agric. Sci. % | A & S Total % | Hum. % | Soc. Sci. % | Phys. Sci. % | Life & M. Sci. % | A & S Undecl. % | Bus. & Econ. % | Educ. % | Engr. % | Hum. Res. % | Nurs. % | Phys. Educ. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dropped for Academic Reasons | 1976 | 8.4 | 13.3 | 9.5 | 3.6 | 7.9 | 12.1 | 4.6 | 12.9 | 5.2 | 6.0 | 9.2 | 4.2 | 2.3 | 3.6 |
| | 1977 | 8.4 | 8.3 | 9.7 | 5.7 | 7.8 | 13.9 | 3.6 | 12.9 | 3.3 | 6.7 | 11.0 | 7.0 | 3.2 | 7.3 |
| | 1978 | 9.1 | 12.8 | 10.3 | 7.6 | 7.6 | 10.9 | 3.7 | 12.7 | 2.3 | 7.0 | 10.9 | 3.9 | 8.9 | 2.3 |
| | 1979 | 6.6 | 9.4 | 7.3 | 5.5 | 5.4 | 9.4 | 2.2 | 9.2 | 2.8 | 6.2 | 8.4 | 4.5 | 3.9 | 0.0 |
| | 1980 | 8.2 | 9.7 | 9.6 | 9.5 | 6.6 | 11.5 | 7.6 | 10.9 | 3.9 | 4.9 | 6.3 | 4.1 | 8.2 | 11.9 |
| | 1981 | 8.7 | 11.3 | 11.0 | 9.6 | 8.1 | 14.3 | 8.8 | 11.9 | 3.6 | 6.6 | 4.6 | 7.3 | 2.2 | 4.2 |
| | 1982 | 7.2 | 8.1 | 8.4 | 5.1 | 5.2 | 11.4 | 5.8 | 10.2 | 3.8 | 4.2 | 7.0 | 5.2 | 3.9 | 2.6 |
| | 1983 | 7.2 | 12.5 | 7.9 | 2.5 | 7.4 | 9.6 | 7.6 | 8.8 | 5.6 | 4.8 | 8.4 | 5.1 | 3.4 | 1.7 |
| | 1984 | 6.4 | 7.5 | 6.8 | 3.5 | 6.0 | 11.0 | 3.1 | 8.0 | 4.8 | 1.1 | 4.0 | 4.7 | 6.4 | 21.1 |
| | 1985 | 6.6 | 6.5 | 7.1 | 4.7 | 7.3 | 7.2 | 3.8 | 8.6 | 6.1 | 5.4 | 2.6 | 9.2 | 5.8 | 6.3 |
| Withdrew Failing | 1976 | 3.5 | 3.2 | 4.2 | 1.8 | 3.7 | 3.5 | 2.1 | 5.9 | 1.6 | 6.4 | 3.0 | 1.2 | 1.2 | 1.8 |
| | 1977 | 3.0 | 4.2 | 4.5 | 3.4 | 2.5 | 4.2 | 1.8 | 3.2 | 1.8 | 4.8 | 2.7 | 4.1 | 1.3 | 3.6 |
| | 1978 | 3.1 | 3.0 | 3.9 | 4.1 | 2.5 | 5.7 | 0.9 | 4.5 | 1.6 | 1.2 | 2.6 | 1.3 | 0.6 | 2.3 |
| | 1979 | 3.6 | 4.3 | 4.7 | 4.8 | 2.8 | 5.5 | 4.5 | 5.2 | 1.1 | 3.7 | 1.7 | 2.6 | 0.6 | 5.5 |
| | 1980 | 3.2 | 3.2 | 3.5 | 2.4 | 1.7 | 2.6 | 2.2 | 5.0 | 1.9 | 4.9 | 3.6 | 2.7 | 2.7 | 1.5 |
| | 1981 | 3.3 | 3.5 | 4.0 | 6.2 | 3.2 | 2.1 | 2.8 | 5.1 | 0.9 | 3.3 | 1.9 | 5.6 | 2.2 | 2.1 |
| | 1982 | 2.8 | 2.4 | 3.2 | 2.8 | 2.0 | 2.8 | 0.7 | 4.9 | 2.0 | 0.0 | 2.0 | 1.7 | 3.1 | 7.9 |
| | 1983 | 2.7 | 6.8 | 2.6 | 3.7 | 2.7 | 1.9 | 3.1 | 2.4 | 1.3 | 2.4 | 0.9 | 5.1 | 4.7 | 5.2 |
| | 1984 | 3.1 | 6.5 | 3.2 | 2.5 | 0.7 | 2.4 | 1.9 | 5.0 | 1.3 | 6.7 | 3.1 | 3.9 | 0.8 | 3.5 |
| | 1985 | 2.9 | 3.9 | 3.3 | 4.7 | 2.3 | 1.1 | 4.6 | 3.7 | 1.6 | 2.7 | 1.5 | 1.4 | 1.9 | 7.8 |
| Withdrew Passing or Before Grades | 1976 | 6.4 | 7.8 | 6.8 | 10.1 | 6.8 | 2.8 | 6.7 | 6.7 | 4.4 | 8.8 | 3.3 | 9.0 | 2.9 | 10.9 |
| | 1977 | 8.0 | 7.5 | 7.4 | 14.7 | 6.9 | 7.7 | 8.6 | 8.6 | 7.2 | 7.6 | 6.1 | 10.0 | 3.8 | 10.9 |
| | 1978 | 6.6 | 8.5 | 6.8 | 11.8 | 5.5 | 4.0 | 7.0 | 6.9 | 5.5 | 8.2 | 3.3 | 10.5 | 3.0 | 13.6 |
| | 1979 | 6.6 | 10.1 | 7.3 | 9.1 | 7.9 | 5.1 | 7.1 | 7.5 | 5.5 | 4.9 | 3.1 | 7.0 | 5.8 | 5.5 |
| | 1980 | 5.9 | 7.1 | 6.4 | 8.9 | 8.0 | 5.1 | 5.1 | 6.0 | 4.4 | 2.4 | 4.5 | 2.5 | 4.8 | 9.0 |
| | 1981 | 7.2 | 7.1 | 8.3 | 13.0 | 7.7 | 6.3 | 8.8 | 8.2 | 5.7 | 8.2 | 2.7 | 8.1 | 4.4 | 6.3 |
| | 1982 | 7.5 | 5.7 | 8.5 | 13.6 | 7.9 | 6.3 | 8.5 | 8.6 | 7.2 | 12.7 | 3.9 | 4.3 | 4.7 | 7.9 |
| | 1983 | 6.3 | 10.2 | 6.8 | 8.0 | 6.3 | 6.5 | 6.6 | 6.9 | 4.3 | 4.8 | 3.7 | 8.1 | 3.4 | 17.3 |
| | 1984 | 7.0 | 8.5 | 7.6 | 10.1 | 8.4 | 5.5 | 7.2 | 7.4 | 4.0 | 12.3 | 5.6 | 7.9 | 6.4 | 1.8 |
| | 1985 | 6.2 | 7.8 | 7.4 | 11.1 | 7.5 | 8.3 | 6.9 | 6.4 | 4.5 | 2.7 | 1.8 | 6.3 | 1.9 | 7.8 |
| Total Attrition | 1976 | 18.3 | 22.3 | 20.5 | 15.5 | 18.4 | 18.4 | 13.4 | 25.5 | 11.2 | 21.2 | 15.5 | 14.4 | 6.4 | 16.3 |
| | 1977 | 19.4 | 21.0 | 21.6 | 23.8 | 17.2 | 25.8 | 14.0 | 24.7 | 12.3 | 19.1 | 19.8 | 21.1 | 8.3 | 21.8 |
| | 1978 | 18.7 | 24.4 | 21.0 | 23.5 | 15.6 | 20.6 | 11.6 | 24.2 | 9.5 | 16.3 | 16.9 | 15.8 | 12.4 | 18.2 |
| | 1979 | 16.8 | 23.7 | 19.3 | 19.4 | 16.1 | 20.0 | 13.8 | 21.8 | 9.4 | 14.8 | 13.2 | 14.1 | 10.3 | 10.9 |
| | 1980 | 17.4 | 20.0 | 19.4 | 20.7 | 16.3 | 19.2 | 14.8 | 22.0 | 10.3 | 12.2 | 14.4 | 14.4 | 15.6 | 22.4 |
| | 1981 | 19.2 | 22.0 | 23.3 | 28.8 | 19.0 | 22.6 | 20.4 | 25.2 | 10.2 | 21.3 | 9.2 | 21.0 | 8.8 | 12.5 |
| | 1982 | 17.6 | 16.3 | 20.2 | 21.6 | 15.1 | 20.5 | 15.0 | 23.6 | 13.0 | 16.9 | 12.9 | 11.2 | 11.8 | 18.4 |
| | 1983 | 16.2 | 29.5 | 17.3 | 14.1 | 16.4 | 18.1 | 17.4 | 18.1 | 11.3 | 12.0 | 13.0 | 18.4 | 11.5 | 24.8 |
| | 1984 | 16.4 | 20.4 | 17.6 | 16.2 | 15.1 | 18.9 | 12.1 | 20.3 | 10.1 | 20.2 | 12.7 | 16.4 | 13.6 | 26.3 |
| | 1985 | 15.7 | 18.2 | 17.8 | 20.5 | 17.1 | 16.6 | 15.2 | 18.7 | 12.2 | 10.8 | 5.9 | 16.9 | 9.6 | 21.9 |

Table 2 ENROLLMENT, DROPOUT RATES AND GRADUATION RATES
FOR FIRST-TIME FRESHMEN IN THE NEWARK CAMPUS (TOTAL CLASS)

| Entering Fall Term | | Enrollment and Dropout rates 1st Fall | 2nd Fall | 3rd Fall | 4th Fall | 5th Fall | After 5th Fall | Graduation rates | 3 yrs. | ≤4 yrs. | ≤5 yrs. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1975 | N | 3190 | 2555 | 2183 | 2017 | 555 | 196 | N | 41 | 1431 | 1818 | 1966 |
| | % enrollment | 100.0 | 80.1 | 68.4 | 63.2 | 17.4 | 6.1 | % | 1.3 | 44.9 | 57.0 | 61.6 |
| | % dropout | 0.0 | 19.9 | 31.6 | 35.5 | 37.7 | 36.9 | | | | | |
| 1976 | N | 3213 | 2620 | 2317 | 2178 | 572 | 172 | N | 40 | 1571 | 1989 | 2124 |
| | % enrollment | 100.0 | 81.5 | 72.1 | 67.8 | 17.8 | 5.4 | % | 1.2 | 48.9 | 61.9 | 66.1 |
| | % dropout | 0.0 | 18.5 | 27.9 | 31.0 | 33.3 | 32.7 | | | | | |
| 1977 | N | 3239 | 2599 | 2253 | 2123 | 597 | 157 | N | 38 | 1523 | 1949 | 2066 |
| | % enrollment | 100.0 | 80.2 | 69.6 | 65.5 | 18.4 | 4.8 | % | 1.2 | 47.0 | 60.2 | 63.8 |
| | % dropout | 0.0 | 19.8 | 30.4 | 33.3 | 34.5 | 35.0 | | | | | |
| 1978 | N | 3085 | 2506 | 2190 | 2051 | 576 | 130 | N | 25 | 1446 | 1886 | 1984 |
| | % enrollment | 100.0 | 81.2 | 71.0 | 66.5 | 18.7 | 4.2 | % | 0.8 | 46.9 | 61.1 | 64.3 |
| | % dropout | 0.0 | 18.8 | 29.0 | 32.7 | 34.5 | 34.7 | | | | | |
| 1979 | N | 3345 | 2780 | 2419 | 2258 | 627 | 147 | N | 29 | 1624 | 2109 | 2212 |
| | % enrollment | 100.0 | 83.1 | 72.3 | 67.5 | 18.7 | 4.4 | % | 0.9 | 48.6 | 63.0 | 66.1 |
| | % dropout | 0.0 | 16.9 | 27.7 | 31.6 | 32.7 | 32.6 | | | | | |
| 1980 | N | 3380 | 2777 | 2376 | 2248 | 639 | 143 | N | 13 | 1571 | 2052 | 2127 |
| | % enrollment | 100.0 | 82.2 | 70.3 | 66.5 | 18.9 | 4.2 | % | 0.4 | 46.5 | 60.7 | 62.9 |
| | % dropout | 0.0 | 17.8 | 29.7 | 33.1 | 34.6 | 35.1 | | | | | |
| 1981 | N | 2957 | 2379 | 2100 | 1967 | 589 | -- | N | 27 | 1329 | 1767 | -- |
| | % enrollment | 100.0 | 80.5 | 71.0 | 66.5 | 19.9 | -- | % | 0.9 | 44.9 | 59.8 | -- |
| | % dropout | 0.0 | 19.5 | 29.0 | 32.6 | 35.1 | -- | | | | | |
| 1982 | N | 3237 | 2670 | 2370 | 2237 | -- | -- | N | 25 | 1391 | -- | -- |
| | % enrollment | 100.0 | 82.5 | 73.2 | 69.1 | -- | -- | % | 0.8 | 43.0 | -- | -- |
| | % dropout | 0.0 | 17.5 | 26.8 | 30.2 | -- | -- | | | | | |
| 1983 | N | 2993 | 2505 | 2204 | -- | -- | -- | N | 11 | -- | -- | -- |
| | % enrollment | 100.0 | 83.7 | 73.6 | -- | -- | -- | % | 0.4 | -- | -- | -- |
| | % dropout | 0.0 | 16.4 | 26.4 | -- | -- | -- | | | | | |
| 1984 | N | 3396 | 2840 | -- | -- | -- | -- | N | -- | -- | -- | -- |
| | % enrollment | 100.0 | 83.6 | -- | -- | -- | -- | % | -- | -- | -- | -- |
| | % dropout | 0.0 | 16.3 | -- | -- | -- | -- | | | | | |

Table 3

WHAT DROPOUTS WERE DOING

| | ALL STUDENTS (N=547) % | RES. STATUS DEL. (N=192) % | RES. STATUS NONRES. (N=355) % | CLASS LEVEL FR. (N=211) % | CLASS LEVEL SOPH. (N+227) % | CLASS LEVEL JR. (N=109) % |
|---|---|---|---|---|---|---|
| Attending another school full-time | 62.8 | 32.4 | 79.0 | 73.3 | 65.5 | 36.4 |
| Attending another school part-time | 8.6 | 8.5 | 8.6 | 7.6 | 10.4 | 6.6 |
| Working full-time | 27.3 | 49.5 | 15.4 | 21.4 | 23.9 | 46.2 |
| Working part-time | 39.6 | 33.0 | 43.1 | 45.7 | 37.8 | 31.0 |

Table 4

MAIN REASON WHY STUDENTS LEFT
1984 - 1986

| Reason | ALL STUDENTS (N=527) % | RES. STATUS DEL. (N=192) % | RES. STATUS NONRES. (N=355) % | CLASS LEVEL FR. (N=211) % | CLASS LEVEL SOPH. (N+227) % | CLASS LEVEL JR. (N=109) % |
|---|---|---|---|---|---|---|
| Program-related | 25.9 | 25.0 | 26.5 | 22.3 | 34.9 | 16.6 |
| Not enough money to continue | 15.6 | 13.3 | 16.8 | 21.4 | 10.9 | 13.8 |
| Unhappy with social environment | 12.0 | 1.6 | 17.6 | 18.6 | 11.3 | 0.9 |
| Unsure of academic goals | 10.7 | 17.6 | 7.1 | 9.0 | 8.1 | 19.3 |
| Family responsibilities | 5.4 | 9.0 | 3.4 | 5.2 | 5.9 | 4.6 |
| Health | 5.0 | 5.9 | 4.5 | 5.7 | 2.3 | 9.2 |

## CAREER AND EDUCATIONAL PLANS OF GRADUATES

Another facet of the University's outcomes assessment is an ongoing study of what degree recipients do following graduation. Information about jobs, salaries, and plans for furthering their education is collected during the year following graduation and a report of the findings is circulated annually (Table 5). The Offices of Admission, the Registrar, Alumni, Public Information, and Career Planning and Placement use information from this annual report as do academic units and the Office of Institutional Research and Strategic Planning.

Table 5

EMPLOYMENT AND EDUCATIONAL STATUS OF 1986 BACCALAUREATES
BY CURRICULUM GROUP

| Curriculum | N* | F/T Major Related % | F/T Major Unrelated % | P/T Major Related % | P/T Major Unrelated % | Fulltime Graduate Student % | Military Service % | Still Seeking % | Not Seeking % |
|---|---|---|---|---|---|---|---|---|---|
| Agricultural Sciences | 63 | 49.2 | 19.0 | 7.9 | 1.6 | 19.0 | 0.0 | 0.0 | 3.2 |
| A&S Humanities | 113 | 41.6 | 23.9 | 1.8 | 3.5 | 19.5 | 1.8 | 0.9 | 7.1 |
| A&S Social Sciences | 249 | 26.5 | 28.9 | 1.6 | 3.6 | 26.9 | 4.4 | 2.4 | 5.6 |
| A&S Life & Health Sciences | 98 | 57.1 | 6.1 | 1.0 | 1.0 | 30.6 | 2.0 | 0.0 | 2.0 |
| A&S Physical Sciences | 104 | 59.6 | 8.7 | 1.9 | 1.0 | 26.0 | 1.9 | 0.0 | 1.0 |
| Business and Economics | 313 | 76.7 | 8.3 | 0.6 | 1.0 | 9.3 | 1.3 | 1.0 | 1.9 |
| Education | 99 | 80.8 | 6.1 | 6.1 | 1.0 | 3.0 | 0.0 | 0.0 | 3.0 |
| Engineering | 150 | 69.3 | 5.3 | 0.0 | 0.7 | 20.0 | 3.3 | 1.3 | 0.0 |
| Human Resources | 120 | 69.2 | 13.3 | 2.5 | 2.5 | 8.3 | 0.8 | 0.0 | 3.3 |
| Nursing | 99 | 93.9 | 1.0 | 1.0 | 0.0 | 0.0 | 1.0 | 1.0 | 2.0 |
| Physical Education | 35 | 25.7 | 22.9 | 22.9 | 0.0 | 25.7 | 2.9 | 0.0 | 0.0 |
| **1986 Total** | **1,443** | **60.4** | **13.2** | **2.4** | **1.7** | **16.6** | **2.0** | **0.9** | **2.9** |
| 1985 Total | 1,483 | 59.6 | 13.6 | 2.0 | 1.7 | 16.0 | 2.3 | 1.3 | 3.5 |
| 1984 Total | 1,659 | 56.4 | 13.1 | 2.5 | 1.9 | 17.7 | 2.2 | 2.0 | 4.2 |
| 1983 Total | 1,554 | 52.7 | 14.4 | 2.8 | 2.6 | 19.0 | 2.1 | 2.3 | 4.1 |
| 1982 Total | 1,418 | 54.2 | 13.5 | 3.3 | 3.5 | 17.2 | 1.7 | 3.1 | 3.5 |
| 1981 Total | 1,607 | 53.8 | 14.8 | 3.0 | 1.8 | 18.6 | 1.4 | 2.7 | 3.8 |

*Respondents to Career Plans Survey

## LONGITUDINAL STUDIES OF CHARACTERISTICS OF NEW FRESHMAN COHORTS

In an attempt to identify changes in educational plans, attitudes, goals and values which may occur during the undergraduate years, questions from a survey administered to new freshmen upon entrance to the University were repeated in a follow-up survey. The questionnaire was sent to students who completed a Student Information Form prior to entrance and were still enrolled at the University almost four years later. The first study of this description was conducted among students who entered in Fall 1973, the original class of 1977. A similar study was recently begun to examine students of the original class of 1987. These two longitudinal studies provide data for comparing characteristics of graduates of the seventies era with graduates of the eighties. Students of the original Class of 1987 rated many aspects of the University more highly than did their counterparts of the original Class of 1977 (Table 6).

Between the first and the fourth year, some students from the Class of 1977 changed their long-term academic degree aspirations (Table 7) as well as their view of factors which were important in choosing a career. Changes in attitudes and life goals occurred over the four years, also, and students seemed to become less idealistic and more conservative.

## OUTCOMES RESEARCH RELATED TO ALUMNI

The University sends surveys to alumni periodically. A study of the graduates of 1980 compared salary data collected during the first year following graduation and information supplied on a follow-up survey in 1985. Another aspect of this study examined the relationships between grades and salaries (Table 8). Although there was a significant positive relationship

Table 6

COMPARISON OF FAVORABLE RATINGS
OF ASPECTS OF THE UNIVERSITY

CLASSES OF 1977 AND 1987

| ITEM | RESPONSES VERY GOOD OR GOOD 1977 % | 1987 % | PERCENTAGE POINT CHANGE |
|---|---|---|---|
| Quality of Classroom Teaching | 70.9 | 87.3 | + 16.4 |
| Curriculum and Course Offerings | 71.1 | 82.3 | + 11.2 |
| Research Facilities and Opportunities | 71.0 | 86.8 | + 15.8 |
| Student Housing | 54.5 | 66.9 | + 12.4 |
| Caliber of Students | 67.0 | 80.7 | + 13.7 |
| Challenge to Produce to Limit | 54.0 | 70.2 | + 16.2 |
| Overall Evaluation of U of D Education | 80.0 | 91.3 | + 11.3 |

Table 7

Class of 1977

A Comparison of
Degree Aspirations of Students as Freshmen and as Seniors

| Highest Degree Planned as Freshmen | Highest Degree Planned for Each Group as Seniors: Percentage Bachelor's | Percentage Master's | Percentage Doctorate | Percentage Other[2] |
|---|---|---|---|---|
| Bachelor's | | | | |
| Women (N=211) | [37.0] | 58.3 | 2.4 | 2.4 |
| Men (N=80) | [60.0] | 32.5 | 5.0 | 2.5 |
| Master's | | | | |
| Women (N=211) | 18.0 | [64.5] | 14.7 | 2.4 |
| Men (N=126) | 23.0 | [64.3] | 9.5 | 3.2 |
| Doctorate[1] | | | | |
| Women (N=75) | 9.3 | 46.7 | [36.0] | 8.0 |
| Men (N=129) | 15.5 | 38.0 | [39.5] | 7.0 |

[1] Includes medical doctorates.
[2] "Other" includes Law, Divinity, and the category "Other" listed on the surveys. Freshmen with degree aspirations in these categories were not included in this table since the numbers were small.

between initial salary and cumulative grade-point average for graduates in five of the ten curriculum groups, the salaries for current or most recent jobs were almost completely unrelated to undergraduate cumulative G.P.A.

Table 8

CORRELATION COEEFICIENTS SHOWING RELATIONSHIP BETWEEN CUMULATIVE GRADE-POINT AVERAGE AND SALARY, AND BETWEEN INITIAL AND CURRENT SALARIES

| | | GPA with First Salary | | GPA with Current or Most Recent Salary | | First Salary with Current Salary | |
|---|---|---|---|---|---|---|---|
| | N | r | p[1] | r | p | r | p |
| Agricultural Sciences | 34 | -.36 | .02 | -.34 | .03 | .26 | n.s. |
| Humanities | 46 | .08 | n.s. | -.07 | n.s. | .31 | .02 |
| Social Sciences | 98 | .24 | .01 | .07 | n.s. | .61 | .000 |
| Life and Health Sciences | 31 | .17 | n.s. | -.15 | n.s. | -.20 | n.s. |
| Math & Physical Sci. | 39 | .45 | .002 | .21 | n.s. | .31 | .03 |
| Business & Economics | 126 | .20 | .01 | .15 | .05 | .44 | .000 |
| Education & P. E. | 42 | .06 | n.s. | -.01 | n.s. | .01 | n.s. |
| Engineering | 57 | .39 | .002 | .07 | n.s. | -.08 | n.s. |
| Human Resources | 55 | -.09 | n.s. | .12 | n.s. | .56 | .000 |
| Nursing | 44 | .28 | .03 | .20 | n.s. | .28 | .04 |

[1] p values greater than .05 have been considered "not significant" (n.s.).

## FEEDBACK ABOUT GRADUATES TO AREA HIGH SCHOOLS

One of the University's computerized reports shows academic information and the progress of students from a single high school, district or state by race (Table 9). Data include indicators from both the Admissions and Student Records data bases, including SAT scores, predicted-grade-indices, University cumulative grade-point-averages, grades in selected college courses in various curriculum areas, and grades in high school courses from similar areas. This type of outcomes research provides valuable feedback to area high schools and represents one feature of the University's public service to the State of Delaware.

## SUMMARY

Student outcomes assessment begins with the student's entrance to the academic institution and continues after departure. Using longitudinal admissions and student records data supplemented by survey information for cohorts of entrants provides a basis for both outcomes and value-added research. At the University of Delaware, this procedure has been utilized by the Office of Institutional Research and Strategic Planning to monitor persistence, attrition and graduation rates for many subsets of students. Creative survey techniques provide data useful in determining reasons for "success" (defined as graduation) or "failure" (dropping out). Although the dimension of value added during the undergraduate years is difficult to measure, changes are evident when pre- and post-graduation surveys are employed. Evaluation and modification of programs is another aspect of outcomes assessment.

Table 9

REPORT ID : UP/4/300
REQUEST DATE: 06/30/87
PROGRAM ID : UP/0,300

UNIVERSITY OF DELAWARE

TOTAL RUN SUMMARY REPORT

PAGE: 1
PRINTED: 06/30/87
VERSION: 04/02/87

NEWARK ONLY

STATE OF DELAWARE PUBLIC SCHOOLS

MATRICULATED STUDENTS ENTERING UD 1986-87 FALL SEMESTER
ACADEMIC PERFORMANCE BY PREDICTIVE CHARACTERISTICS AND BY RACE
THROUGH 1986-87 SPRING SEMESTER

| | TOTAL | CAUCASIAN | ORIENTAL AMERICAN | AMERICAN INDIAN | BLACK AMERICAN | HISPANIC | OTHER |
|---|---|---|---|---|---|---|---|
| NUMBER ENTERING | 672 | 595 | 28 | 1 | 38 | 4 | 6 |
| % DISTRIBUTION BY RACE | 100.0 | 88.5 | 4.2 | .1 | 5.7 | .6 | .9 |
| *AVERAGED PREDICTIVE CHARACTERISTICS | | | | | | | |
| SAT VERBAL | 485 | 490 | 446 | 350 | 464 | 422 | 436 |
| SAT MATH | 535 | 536 | 578 | 470 | 494 | 502 | 493 |
| SAT TOTAL | 1020 | 1026 | 1025 | 820 | 958 | 925 | 930 |
| PREDICTED GRADE INDEX | 2.34 | 2.34 | 2.54 | 1.60 | 2.23 | 2.13 | 2.40 |
| UD CUMULATIVE GRADE POINT AVERAGE | 2.30 | 2.30 | 2.69 | 1.78 | 2.08 | 1.82 | 2.29 |
| *RETENTION THROUGH 1986-87 SPRING SEMESTER | | | | | | | |
| NOT ENROLLED, GPA>=2.00 | 11 | 10 | | | 1 | | |
| NOT ENROLLED, GPA <2.00 | 45 | 41 | 1 | | 1 | 2 | |
| NOT ENROLLED, NO GPA | 9 | 8 | | | 1 | | |
| STILL ENROLLED | 607 | 536 | 27 | 1 | 35 | 2 | 6 |
| *ACADEMIC PERFORMANCE (SELECTED COURSES ONLY) | | | | | | | |
| ---UNIVERSITY GRADES - TOTAL | | | | | | | |
| A | 626 | 557 | 42 | | 21 | 3 | 3 |
| B | 1205 | 1039 | 70 | 1 | 74 | 5 | 16 |
| C | 1077 | 955 | 43 | 1 | 61 | 7 | 10 |
| D | 436 | 374 | 12 | 1 | 41 | 4 | 4 |
| F/Z | 329 | 287 | 11 | 1 | 25 | 2 | 3 |
| OTHER (INCLUDES P/F GRADES) | 229 | 201 | 10 | | 13 | 1 | 4 |
| REMEDIAL COURSE COUNTS | 107 | 86 | 4 | | 13 | 1 | 3 |
| *AVERAGE UD GRADE (A-F/Z ONLY) | 2.37 | 2.38 | 2.67 | 1.50 | 2.11 | 2.14 | 2.33 |
| *AVERAGE HS GRADE (A-F ONLY) | 2.86 | 2.85 | 3.19 | 2.33 | 2.81 | 3.08 | 3.19 |
| ---UNIVERSITY GRADES BY AREA | | | | | | | |
| LANGUAGE COURSES | | | | | | | |
| A | 136 | 121 | 5 | | 8 | | 2 |
| B | 195 | 164 | 11 | | 18 | 2 | |
| C | 52 | 46 | 1 | 1 | 3 | 1 | |
| D | 21 | 15 | 2 | | 2 | | 2 |
| F/Z | 9 | 9 | | | | | |
| OTHER (INCLUDES P/F GRADES) | 16 | 15 | | | 1 | | |
| *AVERAGE UD GRADE (A-F/Z ONLY) | 3.04 | 3.05 | 3.00 | 2.00 | 3.03 | 2.67 | 2.50 |
| *AVERAGE HS GRADE (A-F ONLY) | 3.04 | 3.02 | 3.12 | 2.67 | 3.04 | 3.75 | 3.40 |

REPORT ID : UP/4/300
REQUEST DATE: 06/30/87
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UNIVERSITY OF DELAWARE

TOTAL RUN SUMMARY REPORT

PAGE: 2
PRINTED: 06/30/87
VERSION: 04/02/87

STATE OF DELAWARE PUBLIC SCHOOLS

NEWARK ONLY

MATRICULATED STUDENTS ENTERING UD 1986-87 FALL SEMESTER
ACADEMIC PERFORMANCE BY PREDICTIVE CHARACTERISTICS AND BY RACE
THROUGH 1986-87 SPRING SEMESTER

| | TOTAL | CAUCASIAN | ORIENTAL AMERICAN | AMERICAN INDIAN | BLACK AMERICAN | HISPANIC | OTHER |
|---|---|---|---|---|---|---|---|
| ---UNIVERSITY GRADES BY AREA (CONTINUED) | | | | | | | |
| ENGLISH COURSES | | | | | | | |
| A | 168 | 153 | 8 | | 5 | 1 | 1 |
| B | 340 | 300 | 12 | 1 | 23 | | 4 |
| C | 130 | 114 | 5 | | 10 | 1 | |
| D | 13 | 13 | | | | | |
| F/Z | 13 | 13 | | | | | |
| OTHER (INCLUDES P/F GRADES) | 36 | 33 | 1 | | 1 | | 1 |
| REMEDIAL COURSE COUNTS | 40 | 25 | 3 | | 9 | 1 | 2 |
| *AVERAGE UD GRADE (A-F/Z ONLY) | 2.96 | 2.96 | 3.12 | 3.00 | 2.87 | 3.00 | 3.20 |
| *AVERAGE HS GRADE (A-F ONLY) | 2.85 | 2.83 | 3.07 | 2.25 | 2.89 | 3.00 | 3.27 |
| MATHEMATICS COURSES | | | | | | | |
| A | 119 | 102 | 12 | | 5 | | |
| B | 211 | 172 | 19 | | 14 | 2 | 4 |
| C | 215 | 182 | 10 | | 17 | 2 | 4 |
| D | 143 | 128 | 4 | 1 | 8 | 1 | 1 |
| F/Z | 185 | 162 | 5 | | 17 | | 1 |
| OTHER (INCLUDES P/F GRADES) | 111 | 94 | 6 | | 9 | | 2 |
| REMEDIAL COURSE COUNTS | 67 | 61 | 1 | | 4 | | 1 |
| *AVERAGE UD GRADE (A-F/Z ONLY) | 1.93 | 1.90 | 2.58 | 1.00 | 1.70 | 2.20 | 2.10 |
| *AVERAGE HS GRADE (A-F ONLY) | 2.70 | 2.68 | 3.17 | 2.00 | 2.57 | 2.63 | 2.96 |
| SCIENCE COURSES | | | | | | | |
| A | 124 | 105 | 16 | | 2 | 1 | |
| B | 264 | 227 | 20 | | 10 | | 7 |
| C | 432 | 387 | 19 | | 18 | 3 | 5 |
| D | 160 | 127 | 4 | | 26 | 2 | 1 |
| F/Z | 73 | 59 | 3 | | 7 | 2 | 2 |
| OTHER (INCLUDES P/F GRADES) | 36 | 33 | 1 | | | 1 | 1 |
| *AVERAGE UD GRADE (A-F/Z ONLY) | 2.20 | 2.21 | 2.68 | | 1.59 | 1.50 | 2.13 |
| *AVERAGE HS GRADE (A-F ONLY) | 2.88 | 2.85 | 3.29 | | 2.77 | 2.89 | 3.24 |
| SOCIAL SCIENCE COURSES | | | | | | | |
| A | 79 | 76 | 1 | | 1 | 1 | |
| B | 195 | 176 | 8 | | 9 | 1 | 1 |
| C | 248 | 226 | 8 | | 13 | | 1 |
| D | 99 | 91 | 2 | | 5 | 1 | |
| F/Z | 49 | 44 | 3 | 1 | 1 | | |
| OTHER (INCLUDES P/F GRADES) | 30 | 26 | 2 | | 2 | | |
| *AVERAGE UD GRADE (A-F/Z ONLY) | 2.23 | 2.24 | 2.09 | | 2.14 | 2.67 | 2.50 |
| *AVERAGE HS GRADE (A-F ONLY) | 3.06 | 3.05 | 3.45 | 2.50 | 3.04 | 2.86 | 3.60 |

***** END OF REPORT *****

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# RELATIONSHIPS OF INSTITUTIONAL CHARACTERISTICS TO HIGH, MIDDLE, AND LOW LEVELS OF VOLUNTARY SUPPORT

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University of Pittsburgh

Research is in progress to develop conceptual and empirical models for evaluating fund raising potential and effectiveness with four major donor groups in diverse types of higher education institutions. This paper is a partial report of findings concerning the relationships of institutional characteristics to various outcomes in total voluntary support, and for separate donor groups (alumni, non-alumni individuals, corporations, and foundations). For research objectives, complete methodology, literature review, comprehensive description of study sample, and results of correlational analyses for institutional characteristics and fund raising expenditures with outcome variables, please see Loessin, Duronio, and Borton (1987, April). For a procedure to identify peer groups for comparative evaluation of fund raising outcomes, please see Loessin, Duronio, and Borton (1987, May).

The initial steps in the overall study indicated that the range of variables for institutional characteristics and outcomes varied cosiderably not only among types of institutions but also within types. Although in general fund raisers know that fund raising success is multiply determined, there is a widespread belief that institutions with "more" of certain important characteristics achieve higher totals in voluntary support than institutions with "less." In order to determine

whether more resources were consistently found in institutions with higher levels of voluntary support, we created graphs, called profiles, to depict relationships of institutional characteristics to voluntary support outcomes.

## METHODOLOGY

### Sample

Institutions selected for study were those reporting fund raising information to the Council for Financial Aid to Education (CFAE) for the years 1982-83, 1983-84, and 1984-85. Public and private institutions of five types (research universities, doctoral universities, comprehensive universities, baccalaureate colleges, and two-year colleges) were studied separately, resulting in ten different types of institutions. The study group included 386 private and 189 public institutions, for a total of 575; however, only those institutions for which all data were available were included in the analysis, for a final number of 511.

### Variables

Variables included in the analysis reported here were:

1. Outcome Variables: total voluntary support (TVS), total alumni gifts (AG), total non-alumni individual gifts (NAG), total corporation gifts (CG), and total foundation gifts (FG).

2. Institutional Characteristics: educational and general expenditures, (EG), endowment (END), enrollment (ENR), alumni of record (AR), tuition (TUI), age of institution (AGE), and expenditures per student (EXP). (Alumni of record was excluded as a variable for two-year public colleges. So few institutions of this type report figures for this variable that to have eliminated all those not reporting would have made it necessary to eliminate the entire type.)

Data Collection and Analysis

Data for institutional characteristics and outcomes were collected from published sources. Three-year averages were used for all outcome variables, endowment, and educational and general expenditures to allow for any unusual one-year events. The figures for expenditures per student were calculated by dividing total educational and general expenditures by present enrollment for each institution.

Data for profiles were generated in the following way: institutions were sorted by type and ranked from high to low for each outcome variable. Three groups were formed within each type by dividing the total into thirds, the top third representing the high group, and the middle and bottom thirds, the middle and low groups, respectively.

Grand totals for each institutional characteristic and the outcome variable and totals for each within-type group (high, middle, and low) for each variable were calculated to determine the percent of the resource or outcome each group claimed. For instance, public doctoral institutions achieved an overall total of $315,841,259 in voluntary support. The high group claimed $180,555,596 of this total, or 57.2%; the middle and low groups claimed $96,640,693 and $38,644,970, 30.6% and 12.2%, respectively. Similarly, these institutions have a total alumni of record of 1,495,047; the high group claimed 581,114 of these, or 38.9%; the middle and low groups claimed 467,811 and 446,122, 31.3% and 29.8%, respectively.

Percentages for each group and each variable were plotted to depict relationships between outcome variables and institutional characteristics at each level for ten types of institutions with five outcome variables, and for all institutions with five outcome variables, for a total of 55 profiles.

## RESULTS AND DISCUSSION

Profiles were compared in three ways: by groups with high, middle, and low levels of voluntary support; by types of institutions; and by kinds of donors. Only the first comparison is discussed in this paper. Discussions of other comparisons are available from the authors.

### The "Expected" Pattern

The profile for total voluntary support for all institutions, shown in Figure 1, supports in a highly dramatic way the popular belief about the relationships of institutional characteristics to levels of voluntary support outcomes. (Profiles for all institutions for each donor group, not shown, are very similar to that for total voluntary support.) In this profile, institutions in the top third amass 85% of all voluntary support and clearly have the greater portion of the resources implied by each institutional characteristic. Middle and low groups are also clearly distinguished. These data, taken alone, lend strong support to the belief that levels of institutional resources are important factors in levels of voluntary support.

However, when profiles for types of institutions are examined, the data tell a more complex story. Out of 50 profiles, (one for each type of institution for total voluntary support [n = 10] and for each of four donor groups [n = 40]), only 19 profiles (38%) closely depict the "expected" pattern. One profile typical of this group is that which depicts relationships for total voluntary support in private research institutions, as shown in Figure 2. Thirteen additional profiles, not shown, which largely conform to the expected pattern are: (a) private research -- CG and FG; (b) private comprehensive -- TVS, AG, NAG, CG, and FG; (c) private baccalaureate -- TVS, AG, NAG, and CG; (d) private two-year -- AG; and (e) public comprehensive -- AG.

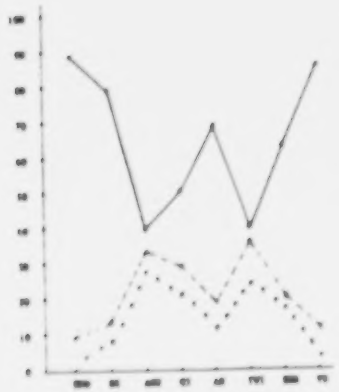

FIG. 1. All Insts. - TVS (Expected)

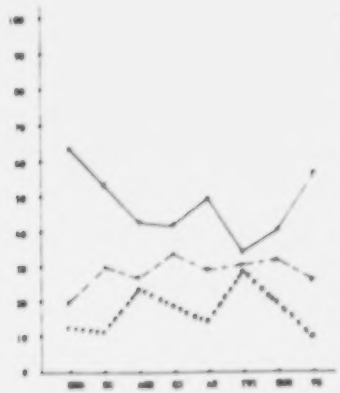

FIG. 2. Priv. Res. - TVS (Expected)

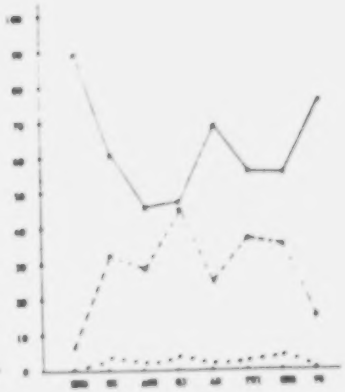

FIG. 3. Publ. Bacc. - TVS (Expected)

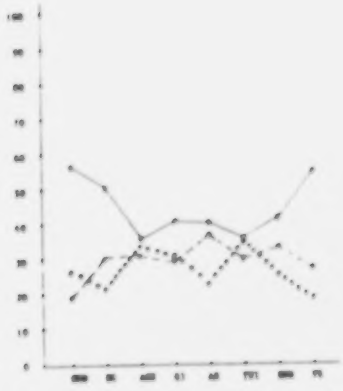

FIG. 4. Publ. Res. - TVS (Approaching)

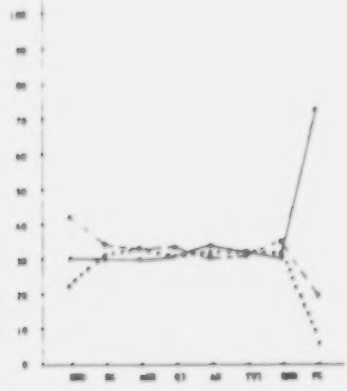

FIG. 5. Priv. Bacc. - FG (Maverick)

High ——
Middle ---
Low ...

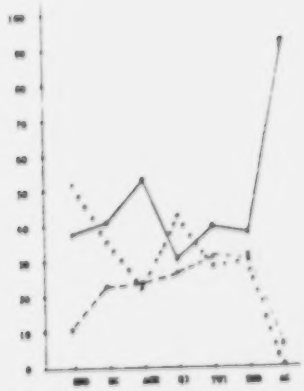

FIG. 6. Publ. 2-Yr. - AG (Maverick)

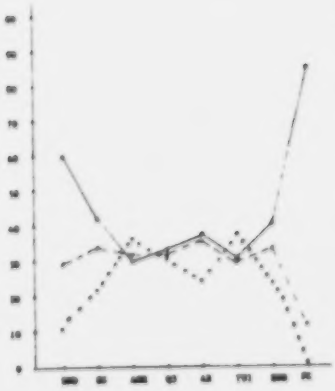

FIG. 7. Publ. Comp. - FG (Maverick)

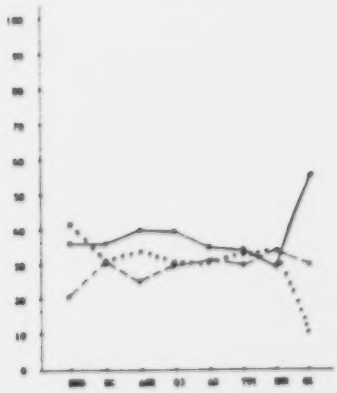

FIG. 8. Priv. 2-Yr. - CG (Maverick)

The remaining profiles in this category, included with reservations because they are unusual, are the five depicting relationships in public baccalaureate colleges. Figure 3, for total voluntary support, is representative of these five. Although these profiles fit the expected pattern, they do so "in extremis" and, while very similar to each other, differ considerably from any other profiles in the set. The differences among levels is beyond what is expected in institutions of the same type. (As will be discussed in a forthcoming paper, particularly striking is the way in which profiles for this type of institution differ from types of institutions generally thought to be most similar to these [i.e., public two-year colleges and public comprehensive universities].)

It is important to note that, excluding the five profiles for public baccalaureate colleges, only one of the profiles depicting the expected pattern represents public institutions. Therefore, this analysis indicates that the commonly-held notion concerning the relationships of institutional characteristics to outcomes in voluntary support actually only refers to what is true in certain types of institutions with certain donor groups. Expectations about these relationships do not appear to apply across the board to all donor groups in all types of institutions. Most notably, the expected pattern does not appear in most public institutions or in private doctoral universities, or, among donor groups, for foundation gifts.

The remaining profiles have been grouped into two additional categories. These categories have been descriptively named (a) "approaching the expected," and (b) "mavericks."

"Approaching the Expected"

Profiles which fall into category of "approaching the expected" are nine in number and include (a) private research -- AG and NAG; (b) private

doctoral --TVS and CG; (c) public research -- TVS; (d) public doctoral -- TVS; and, (e) public comprehensive -- TVS, NAG, and CG. Profiles in this category have some major features of the expected pattern but also have significant deviations.

One profile representative of this group is for total voluntary support in public research universities, shown in Figure 4. In this profile, as in the others in this category, several deviations occur which prevent placement of this profile in the "expected" category. For instance, on this profile the high group, although clearly distinguished from the middle and low groups, is not very different from the middle and low groups on age of institution and tuition. While the expected relationship between voluntary support and endowment appears for the high group, there is overlap between middle and low for endowment (i.e., the group in the middle for voluntary support has the lowest percentage of all endowment dollars, and the low voluntary support level has the middle amount of endowment); and the low level for voluntary support has a higher percentage than the middle group for age of institution and tuition.

One explanation for the emergence of this category might be that in a larger or different sample of institutions, the patterns would more closely approximate the expected. Another explanation might be that our expectations are true more or less, with random deviations or deviations occurring in certain types of institutions at certain outcome levels or for certain donor groups.

"Mavericks"

The last category includes the remaining 22 profiles (44%), labeled "mavericks," because they do not support the commonly-held notion about the relationships of institutional characteristics and voluntary support

outcomes. In fact, one sub-group within this category not only does not support the commonly-held belief, but also seems to defy it. The "defiant" group among the mavericks includes seven profiles, which are (a) public two-year -- TVS, AG, NAG, CG, and FG; (b) private bacclaureate -- FG; and (c) private two-year -- FG.

Examples shown in Figures 5 and 6 represent this subgroup. One of the most interesting profiles of the entire set is that shown in Figure 5, which depicts relationships for foundation gifts in private baccalaureate colleges. This profile is strikingly different from not only other profiles for this type of institution but also from every other profile in the study. Any conclusion about the relationships of institutional characteristics to outcomes in gifts from foundations, based on this profile alone, would be that there is no relationship between institutional characteristics and outcomes for voluntary support.

The profile in Figure 6 for alumni gifts in public two-year colleges is also unique, but in different ways than is the profile in Figure 5. In Figure 6, the expected relationships between endowment and other institutional characteristics with outcome levels and the expected distinctions between high, middle, and low levels simply do not occur.

The remaining mavericks are those which do not resemble nor approach the expected pattern, but also are not particularly extreme or dramatic in their deviation from the expected. The fifteen profiles in this category are (a) public research -- AG, NAG, CG, and FG; (b) private doctoral -- AG, NAG, and FG; (c) public doctoral -- AG, NAG, CG, and FG; (d) public comprehensive -- FG; and (e) private two-year --TVS, NAG, and CG.

Profiles for foundation gifts in public comprehensive universities and alumni gifts in private two-year colleges are presented as examples and appear in Figures 7 and 8. There are no discernible relationships

reservations), the percent of profiles for public institutions drops to 24% in the "expected" category and increases to 76% in the "maverick" category.

Another way to examine these data is to identify whether outcomes with certain donors fall more into expected or maverick categories. As indicated in the table, while eight of the ten profiles for total voluntary support fall into the expected categories, only three of the ten occur in these categories for outcomes from foundation donors.

## CONCLUSIONS AND RECOMMENDATIONS

These profiles provide new information about the relationships of institutional characteristics to voluntary support outcomes for all institutions and for institutions by type. The profiles also provide information about the relationships of institutional characteristics to outcomes with specific donor groups.

Without further evidence, the one obvious conclusion is that our commonly-held idea that institutions with higher levels of key resources acquire larger amounts of voluntary support does not appear to be true for all institutions nor with all kinds of donor groups. The expected relationship occurs far more frequently in private institutions than in public ones, and for total voluntary support than for specific donor groups, particularly foundation donors. This may suggest that we know a great deal more about how institutional characteristics are related to voluntary support outcomes in private institutions, and (either conversely or in addition) that institutional characteristics are more closely related to voluntary support outcomes in private institutions than in public. Furthermore, it may be true that we may be more confused than we think about relationships of institutional characteristics to outcomes

among profiles within this category, nor any specific or consistent deviation from the expected pattern, except for a tendency on some profiles to "flatten out" on variables other than endownment and outcome (i.e., for high, middle, and low groups to appear more similar).

Summary of Pattern Comparisons

As indicated in Table 1, 68% of the profiles for private institutions

Table 1

Number and Percent of Profiles by Pattern Category

| | Category | | |
|---|---|---|---|
| Profiles | Expected or Approaching | Maverick | Total |
| By Institutions | | | |
| Private | 17 (68%) | 8 (32%) | 25 (100%) |
| Public | 11 (44%) | 14 (56%) | 25 (100%) |
| By Donor Group | | | |
| Total Voluntary Support | 8 (80%) | 2 (20%) | 10 (100%) |
| Alumni Gifts | 6 (60%) | 4 (40%) | 10 (100%) |
| Non-Alumni Gifts | 5 (50%) | 5 (50%) | 10 (100%) |
| Corporation Gifts | 6 (60%) | 4 (40%) | 10 (100%) |
| Foundation Gifts | 3 (30%) | 7 (70%) | 10 (100%) |

fall into the "expected" or "approaching the expected" categories. While the table indicates that 44% profiles for public institutions fall into these categories, if the five profiles for public baccalaureate colleges are removed (which were included in the "expected" category with

with specific donor groups, given that between 50 to 60% of profiles for alumni gifts, non-alumni individual gifts, and corporation gifts fall in the maverick category.

The profiles indicate that the more agggregated the data are, either by types of institutions or by donor groups, the more likely we are to find the expected pattern. Paton (1985) observed that "inappropriate aggregation" of voluntary support outcomes is a serious flaw in overall fund raising research. The results of this analysis suggest that inappropriate aggregation in the way we have traditionally conceptualized fund raising may be the derivation of such commonly-held ideas as the one discussed in this paper.

Clearly, the importance of the research presented here is that there are gaps in our knowledge regarding effectiveness in higher education fund raising and that we may not even be certain where the gaps are. Additional empirical study is necessary to separate fact from myth, to integrate experience-based and research-based knowledge, and to identify better methods for evaluating effectiveness in fund raising.

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# KNOWLEDGE BASED SYSTEMS IN INSTITUTIONAL RESEARCH

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STATE UNIVERSITY OF NEW YORK

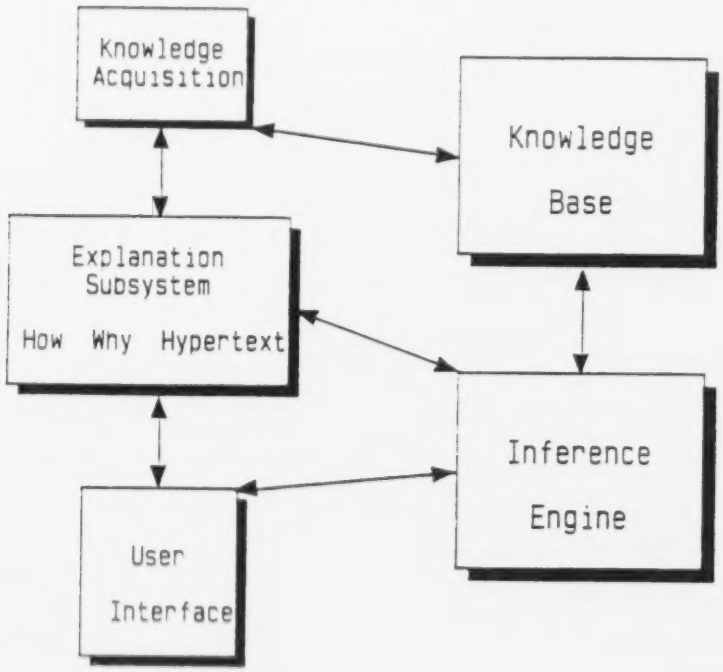
Artificial Intelligence (AI) that "subfield of computer science concerned with the concepts and methods of symbolic inference by a computer and the symbolic representation of the knowledge to be used in making inferences, . . . pursues the possibility that a computer can be made to behave in ways that humans recognize as 'intelligent' behavior in each other." (Feigenbaum and McCorduck, 1983) The three subfields of AI are natural language processing, robotics, and expert systems. IR professionals are most likely to be concerned with expert systems, here referred to as knowledge based systems. Knowledge based systems help an "expert" establish a set of logical constructs which that expert would use to solve a specific problem. A knowledge based system is an efficient and effective tool for making expertise in a specific area accessible to others. This paper will review the basic concepts of knowledge base systems as a means of aiding professionals to understand the possibilities of these systems for the IR environment.

Knowledge base and expert systems have not been defined in any standard manner within the AI field. The following example is offered as generic illustration for the readers' information. Developing an expert system is akin to finding a noble laureate and extracting his or her knowledge on their area of expertise. Some systems already in use include highly specialized medical diagnostic systems. However, knowledge base systems, focus on capturing a specific expert's wisdom; someone, who for whatever reason, has gained knowledge others depend on for solutions of day to day problems. It is quite useful especially to the organization,

but is not likely to be of the same scope as an expert system (see Layne, 1987 for a fuller discussion on selection of appropriate problems for a knowledge base).

Local IR experts who hold sole knowledge of their part of the organization are good candidates to develop knowledge base systems. Before discussing the process, an understanding of the typical components of a knowledge base system is required.

TYPICAL KNOWLEDGE BASE STRUCTURE



## TYPICAL COMPONENTS OF A KNOWLEDGE BASE SYSTEM

### KNOWLEDGE ACQUISITION

The primary goal is to capture the knowledge and the processes an individual uses to solve a problem, here referred to as heuristics. Heuristics is the methods, procedures, knowledge and experience called upon to solve a problem. This can be done in one of two recommended ways. (For a third method of acquiring knowledge and heuristics, see "Building Rule Bases with Induction" by Larry R. Harris. Also there are specific pieces of software available that use this method in creating knowledge bases. One is listed in the Resource Section.)

The first and more formal way to acquire the knowledge of an expert is through the use of a knowledge engineer. This person is skilled in the extraction of knowledge from others for the purpose of developing the knowledge base. This individual typically has a computer science background, interview skills, and is capable of developing an understanding of the problem. He or she would work with an administrator to identify the problem, and then work with the expert to develop an understanding of the heuristics necessary to solve that problem. From this process, the knowledge engineer would build the knowledge base. The building process would typically go through several iterations in which the expert would use the system and make suggestions to the knowledge engineer for improvements and changes. This process is referred to as prototyping and is used also in Decision Support Systems creation.

The second method is the use of micro knowledge base shells to establish cost effective vehicles. As such, this will perhaps be more attractive to the IR professional. Here the individual who is close to the problem and has intimate knowledge of the situation will be the

"knowledge engineer". The interaction between an expert and knowledge engineer might be replaced by a self-examination process. Having a co-worker ask questions may help the person think the issues through logically, not just once, but through several versions. Another possibly could be to recall how the problem might be handled if someone was to call on the phone. Asking someone uninitiated to the process to interview the in-house knowledge engineer and then taping the conversation for later analysis, might reveal information that one might have assumed was common knowledge. Using decision trees (see figure on next page) can also help you organize your thoughts in a logical format.

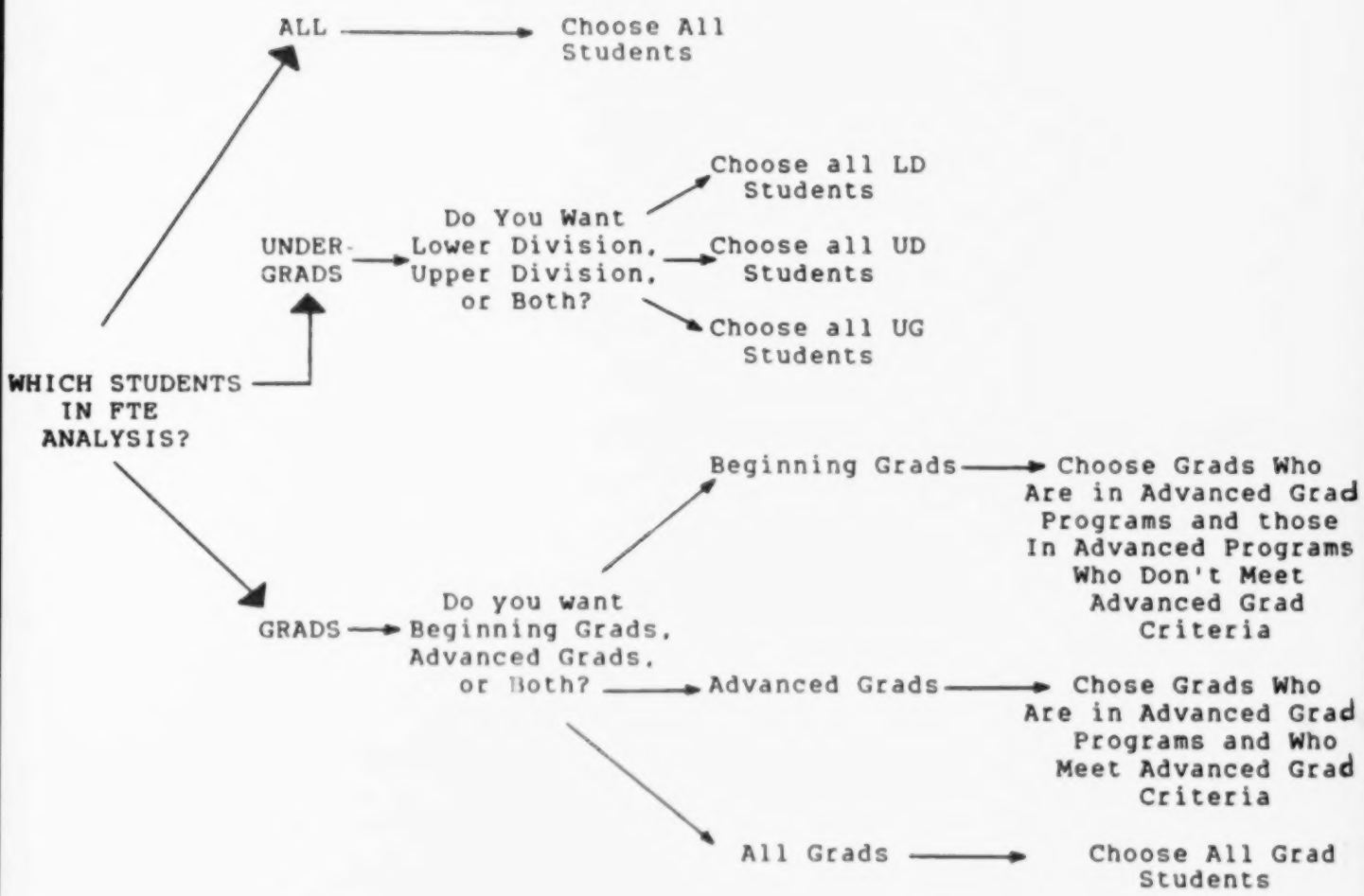
The remaining discussion on developing knowledge based systems will focus on the IR professional doing the actual development work.

THE KNOWLEDGE BASE

In the process of developing logical constructs, certain aides are necessary. The one most often used is the decision tree format. Most knowledge based software approach solving a problem using the decision tree format. Below is a diagram showing a very simple process of deciding what data to select to create a report. What the knowledge base user sees is simply the group of students necessary for the creation the FTE analysis report. The expert has designed the system to query for the exact specification on selecting the appropriate group of students for this problem. The knowledge base in its simplest form follows the decision tree rules.

The most frequently used structure in knowledge base software is the "IF . . . THEN" construct. In the diagram, IF the group of students selected is undergrads, THEN select all students who are undergrads to complete the FTE analysis.

EXAMPLE OF A DECISION TREE


WHICH STUDENTS IN FTE ANALYSIS?
ALL
Choose All Students
UNDER-GRADS
Do You Want Lower Division, Upper Division, or Both?
Choose all LD Students
Choose all UD Students
Choose all UG Students
GRADS
Do you want Beginning Grads, Advanced Grads, or Both?
Beginning Grads
Choose Grads Who Are in Advanced Grad Programs and those In Advanced Programs Who Don't Meet Advanced Grad Criteria
Advanced Grads
Chose Grads Who Are in Advanced Grad Programs and Who Meet Advanced Grad Criteria
All Grads
Choose All Grad Students

INFERENCE ENGINE

This component of the knowledge base system contains the controls and the inference strategies used. The software controls the throughput in the knowledge base. Any conflicts in processing are resolved by the strategies built into the specific software. The inference aspect mimics how the expert would reach conclusions. This description is somewhat simplistic. A more detailed explanation on this specific topic can be found in Expert Systems (1985, pp 49 - 60).

USER INTERFACE

Each one of the software products recommended to IR professionals (see resource section at the end), has a very well designed user interface. This component facilitates the user's exploration of the problem; he or she supplies certain information for the knowledge base which guides the user through certain processes.

Below is an example of a question posed to a user. If "graduates" are chosen, then a fact has been established: Students who are eligible to be grads are the selected population.

---

What types of students do you want included in this FTE analysis?

All
Undergraduates
Graduates

F1 Help F2 Why F3 How F4 Hypertext F10 Quit

---

EXPLANATION SYSTEM

WHY, HOW, and HYPERTEXT are three elements sometimes included in knowledge base software. Why and How can be found in most software, while Hypertext (sometimes referred to as threads) is relatively new. If the user, pressed the F2 (Why) or F3 (How) function keys while on the screen with the FTE analysis question above, the following text would appear.

**F2 Why**

In order to complete the FTE analysis, we need to know the group of students to be included.

---

**F3 How**

If FTE report is requested then determine what group of students should be included.

---

Hypertext provides definitions or explanations for key concepts or words that are highlighted (boxed in this instance) within the text. On the FTE analysis question above, the word FTE is boxed. By pressing the F4 (hypertext) key, explanations or definitions are presented. This can be many level deep. One can see how the term "threads" evolved. The example below gives the definition for FTE, if the user wants more information on the concept. The reader will also notice other words boxed in the definition. This means the user can press the F4 function key for each one of these highlighted words to obtain further definitions or explanations.

F4 Hypertext

Full-Time-Equivalent (FTE) enrollments are a State University-Wide means of equating the total of semester credit enrollments to a standard definition of a "full-time" student. That definition is 15 semester credit hours for undergraduates and 12 semester credit hours for graduate students other than those in advanced graduate programs and with advanced graduate status.

F4 Hypertext

STRENGTHS AND WEAKNESSES OF KNOWLEDGE BASE SOFTWARE

Given that microcomputer knowledge base software is relatively new, clear standards have not yet been established. One can find a great deal of variation in the options offered. What follows are some general statements that can be made in regards to the strengths and weaknesses of this software, although each statement may not be true in all instances.

Several of the commercially available software pieces are capable of accessing other software (e.g., DOS, dBase III, Lotus 1-2-3, Pascal) and then returning back to the knowledge base. This is an excellent way to utilize the power of other pieces of software that may be more appropriate for a specific function.

Knowledge base systems are not good for computational applications. Knowledge base software should be thought of as symbolic as opposed to numeric programming. Its true strength lies in being able to manipulate strings of symbols (i.e., facts) with logical rather than numeric operators. (Harmon and King, 1985)

The techniques used to develop knowledge based software are capable of being encapsulated into a hybrid piece of software. Hybrids offer some of the capabilities knowledge based software, but integrated within other types of software. Texas Instruments' Arborist Decision Tree Software is a good example of hybrid software. Lotus will introduce in November 1987 a program called Agenda. It has been described as having the capability that would allow users to analyze ideas and text like numbers are analyzed on spreadsheets.

In examining the software, the author has found the Input/Output to be somewhat slow. This is due partly to the type of operating system which takes longer to translate these languages into machine code. Another factor for the lack of speed is the way in which the inference engine processes information. Within the next few years, this problem will most likely be corrected with the greater use of the UNIX operating system, and with hardware improvements such as parallel processing.

When a user sits down and runs through a particular knowledge base, some software has the capability of capturing what the user enters during the session, i.e., how the user responded to questions. One can see how this would allow assessment of training exercises. In addition, batch files can be created which can have many uses such as processing survey results without any data entry.

In the author's opinion, one mandatory feature is a run-time capability. A run-time version creates a specific knowledge base that is not modifiable and has deactivated certain programming features. This gives management the capability to make copies and distribute a specific knowledge base for operational use. The run-time version takes less computer memory and is faster.

TYPES OF SOFTWARE AVAILABLE

The types of microcomputer software available are on a continuum from high level languages like LISP and PROLOG to environments like Nexus and KnowledgePro to tools like Texas Instruments' Personal Consultant Series. Languages like LISP offer the most flexibility but are the most difficult to use while tools are the easier to use but have more restricted capabilities. Unless the reader has been trained in the use of a language like LISP, it is recommended that one starts using a tool (Harmon and King, 1986, pp 82-91). A shell is a tool referred to a lot in advertisements for expert systems software. It already has the AI framework already developed. The user only needs to add the rules.

THE STATE OF THE ART IN INSTITUTIONAL RESEARCH

Using the AIR "BITNET" Newsletter, ISSAC, and various other leads, the author discovered that knowledge base systems in IR units are in embryonic stages. There is a fair amount of interest in IR offices, but other professional demands hinder the development of these systems.

Virginia Tech's IR office[1] has connected their mainframe electronic factbook with PROFS to help users define populations they wish to retrieve. Currently, work is starting on a knowledge base for faculty statistics.

York University in Toronto Canada[2] is in the beginning stages of developing a model for advising students. Students using the system will receive on-line guidance plus a paper report based on their characteristics, e.g., student level and major. It also will permit some "what if" queries so the student could test out possible major changes, for example. The software selected for this project is GURU.

**KNOWLEDGE BASE SYSTEMS FOR INSTITUTIONAL RESEARCH**

The chart on the next page delineates problems facing IR offices. Right next to the problem is an example of how a knowledge base system could address each type of problem. The exciting aspect of using knowledge base software is the creative ways one can solve old problems. The classic IR problem of the information requestor wanting data, but not able to verbalize exactly what is needed. A knowledge base would help define what data the information requestor really wants and then list out all the assumptions and necessary definitions made along with the report.

Knowledge base software may open up a new era of microcomputing in IR offices. Further discussion needs to happen to fully explore the true usefulness for Institutional Research.

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[1] Thanks to John Muffo, VT's IR Director who was quite helpful to the author as she attempted to determine how knowledge base systems are playing a role in IR offices.

[2] Thanks to Sheldon Levy and Paul Craven

| IR PROBLEMS | EXAMPLES |
|---|---|
| - Training (new staff, new procedures) | - New staff can learn basic IR concepts (e.g., FTE, faculty workload, matriculation) |
| - Interface Between User and Another System | - Before users can extract data from the University data base, all terms will be defined and assumptions then printed out along with the report |
| - Documentation and Communication of | - SUNY Central's CASA (Course and Complex Procedures Section Analysis) would be a good candidate |
| - Examine/Explain Policy Decisions/ Options | - In such areas as enrollment management |
| - Access Experts and Consultants for Specific Advice | - Before undertaking a project like outcomes research, access IR experts in the field via knowledge base |
| - Small IR Office Without a Programmer Analyst on Staff | - Allows sophisticated users to build knowledge bases |
| - Track responses | - Knowledge base system as a survey instrument |
| - Need to Submit "Smart Reports" | - Executive reports accompanied by knowledge base explaining rules and assumptions |
| - Monitor Increasing Volume of Information | - With a specific topic such as salary equity, knowledge base can analyze and abstract information |

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Harmon, Paul and King, David. Expert Systems: Artificial Intelligence in Business. New York: John Wiley & Sons, Inc., 1985.

Harris, Larry R. "Building Rule Bases with Induction" in Information Center, June 1987, p 17, 33 (3,6).

Layne, Richard. "AI: Approaching the Final Frontier" in Information Week, pp 20-25, March 16, 1987, Issue 108.

## RESOURCE SECTION

### EXPERT SYSTEMS SOFTWARE

Product Name: EXSYS Company: California Intelligence
Address: 912 Powell Street #8, San Francisco, Calif. 94108 (415) 391-4846
Runs on: IBM PC/XT/AT (640K, DOS 2.0+) - VAX/VMS - UNIX - ALSO NEED IQLISP
Price: $395 (Ver 3.2), $600 (Run-time License), $15 for demo Also need IQLISP from Integral Quality, Seattle, WN (price not quoted). Subtract 35% for Educational Discount
Notes: Expert System "Shell" intended for those not necessarily trained in AI, but knowledgeable at solving specific problems. Also has add on modules for extra cost.

Product Name: GURU Company: Micro Data Base Systems
Phone: (317) 463-2581
Runs on: IBM XT/AT; DEC VAX environment
Price: $2,995; GURU Tutor $75; substanial fee for each run-time application
Notes: Never received any literature from this company. I've included them because the product is an integrated package. It includes a data base management system, word processing, spreadsheet, forms generation, graphics, and communications feature in addition to the expert systems shell.

Product Name: Instant Expert & Instant Expert Plus
Company: Human Intellect Systems, 1670 So. Amphlett Blvd., Ste 326, San Mateo, CA 94402 (800) 522-5939 Runs on: IBM, Macintosh, Apple II, Atari ST On IBM needs GEM for graphics Prices: Instant Expert - $49.95, I E Plus - $498 Includes unlimited run-time applications
Notes: Family of products - I've excluded NEXUS the top of the line - need to be an AI programmer to use it. Small company, but product looks good

Product Name: KnowledgePro Company: McGraw-Hill/Knowledge Garden
Address: 473A Malden Bridge Road, Nassau, N.Y. 12123 (518) 766-3000
Runs on: IBM PC/XT/AT (320K, DOS 2.0+) - Color Monitor desirable Hard Disk recommended
Price: $495 (Ver 1.0) Includes unlimited run-time applications. $30 for demo P.O. acceptable Available December 1, 1987
Notes: Expert System "Environment" makes it a bit harder to learn but gives user greater power. BETA version (on XT) was a little slow, but gives you the most capabilities for the price.

Product Name: Personal Consultant Series Company: Texas Instruments
Address: Box 809063, Dallas, TX 75380-9063 (800) 847-2787 - pricing & ordering
Runs on: P C Easy runs on TI Professional, Portable Professional or Business-Pro; IBM PC/XT/AT (true compatible) (512K, DOS 2.0+) Hard disk with floppy or two disk drives; P C Plus runs on TI Business-Pro or IBM AT (640K, DOS 2.0+) Hard Disk with floppy
Price: P C Easy Lists for $595, $357 with educational discount; $25 for demo; Nominal fee for each run-time application created.
Notes: Ran demo of P C Easy - looks like good stable product without frills. TI has great literature and a nice newsletter.

INDUCTION SOFTWARE

This type of software looks at historical and sample data and creates rules.

Product: KnowledgeMaker Company: McGraw-Hill/Knowledge Garden
See details above in KnowledgePro
Price: $99; Demo is $30

NEWSLETTER

Expert System Strategies - Monthly Newsletter for Managers and Developers of Expert Systems. About 20 pages each issue. Paul Harmon - Editor
Price: $247 for 1 year subscription Address: Cutter Information Corp. 1100 Massachusetts Avenue, Arlington, MA 02174
Notes: Very expensive, but you can write for one free issue.

# CORNELL'S ACADEMIC PERSONNEL DATABASE

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Institutional Planning and Analysis
CORNELL UNIVERSITY

## Introduction

The Academic Personnel Database (APDB) is an ADABAS structured on-line, menu-driven, analytic database which has been in operation at Cornell since September 1, 1983. The APDB captures personnel data for all academic employees on Cornell's Ithaca and Geneva campuses. The database captures five years of data on academic employee populations although, certain data elements may go back to the 1970's and earlier.

## Purpose

The APDB was designed primarily to service the administrative data needs of the University by providing accurate, timely and consistent analytic information. For example, annual and ad hoc salary reports, monitoring reports for affirmative action and projections of retirements are developed utilizing output from the database. Another key objective was to eliminate the tedious process of manually recording academic personnel transactions in a central card file and the duplication of effort across many units (this objective has yet to be fully realized).

## Approach

The database was designed and developed in two phases.

### Phase I (complete)

This phase allowed for the creation of linked demographic, appointment, and salary files. All data are entered in codes which correspond with the University coding structure for operational databases. Data elements captured include biographic information, rank, tenure, leave, degree, endowed professorship, percent time, organizational unit, academic appointment, administrative appointment and salary information. The database can accommodate historic, current, and future academic/administrative appointment and salary information.

Phase II (in process)

Future expansion of the database will include additional data elements (e.g. time earned towards sabbatic leave) and greater on-line analytic capability to select key data elements within pre-defined populations. While a number of central offices have developed a link to the APDB, plans are being considered to provide access to each college within the University.

Existing User Links With APDB

- Academic Personnel Office
- Dean of Faculty
- Graduate School
- International Students Office
- Office of Sponsored Programs
- Traffic Bureau

Overview

The Office of Institutional Planning and Analysis maintains the APDB. A full-time research aide updates academic employee records from data captured on approved personnel appointment forms. A batch link every two weeks with the Payroll/Personnel system merges current salary records into the APDB salary file.

The record key for the APDB system is the social security number. However, individual name searches can also be accommodated. Information on an employee is obtained by reviewing an on-line inquiry screen or printing a status sheet.

A number of capabilities exist for extracting data. According to various levels of security, users may have access to:

a. On-line programs which generate counts and lists of pre-defined populations by entering a user identified date range (requires minimal computer skills).

b. Batch programs for reports and analyses which get produced periodically and tend to be lengthy.

c. Ad hoc query capability which allows for the selection of records by entering criteria from a menu of data fields. This allows one to answer limited types of specialized requests.

d. Technically advanced NATURAL programming to extract a population dataset. Further analysis and manipulation of the extracted data can be done in various languages although SAS is our primary tool.

Implications

The strength of such a powerful and information rich system has timesaving advantages for institutional researchers. The future of the analytic database rests with the ability to maintain the integrity and reliability of such a system for those who use the data for decision making. As administrators search to understand the "big picture" over long periods of time, historic information can be incorporated and permanently captured on a single database.

The long standing issue again arises of centralized versus decentralized management information systems. The ability of Institutional Planning to maintain the APDB while providing a link/service to other systems and departments within the University brings several new issues to the forefront.

As the APDB is shared with those beyond the scope of the research office or interrelated offices, concern arises over security and what subset of the database should be available to individual units. Along with receiving access to a database comes the added desire to manipulate the data to suit individual needs. Proper advance training and continual support is essential in this phase. Otherwise, the goal of reliable, consistent and properly interpreted data may never be achieved.

All in all, the flexibility of a system that allows for the selection of various date ranges and populations is invaluable in the versatility with which one can respond to special requests and new forms of analyses from a common base.

FPS02S ACADEMIC PERSONNEL DATABASE DATE: 10/12/87
STATUS SHEET PAGE: 1

NAME: CORNELL, JOHN C SSN: 123-12-3123
TITLE: PROFESSOR TENURE: 1971 07 01
DEPT: BIOCHEMISTRY (STAT) TERMINATED:
AA UNIT: BIOLOGICAL SCIENCES COLLEGE: AGR/LIFE SCIENCES

********** BIOGRAPHIC INFORMATION **********

SEX: MALE RACIAL/ETHNIC: WHITE (NOT HISPANIC ORIGIN)
DATE OF BIRTH: 1940/01/01 MARITAL STATUS: MARRIED
HANDICAPPED: N VISA TYPE:
VETERAN STATUS: CITIZEN STATUS: U.S. CITIZENSHIP
PATENT AGREEMENT: YES COUNTRY OF CITIZEN: UNITED STATES

NOTES AND COMMENTS:
HOME ADDRESS:
OFFICE ADDRESS: BIOCHEM AND MOLECULAR BIOLOGY
100 WING HALL, ITHACA, NY 14853
MAIL ROUTE: 3T

********** RANK HISTORY **********

| EFFECTIVE DATE | END DATE | TITLE |
|---|---|---|
| 1965/07/01 | 1971 06 30 | ASST. PROF. |
| 1971/07/01 | 1977 10 31 | ASSO. PROF. |
| 1977/11/01 | | PROFESSOR |

********** TENURE INFORMATION **********

| DATE TEN TRK | DATE TENURED | DEPARTMENT(S) TENURED |
|---|---|---|
| 1965 07 01 | 1971 07 01 | BIOCHEMISTRY (STAT) |

********** ENDOWED PROFESSORSHIP **********

EFFECTIVE DATE: 1980 07 01 END DATE: 9999 99 99
NAME OF ENDOWED PROFESSORSHIP:
ALBERT EINSTEIN PROFESSORSHIP OF BIOCHEMISTRY

********** ACADEMIC APPOINTMENT HISTORY **********

| TYPE | DATE EFFECTIVE CHANGE | END | STAT | TEN | SUB | TITLE/ SEARCH | AA UNIT/ DEPT | YR | FTE | RET | TMR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P | 19650701 | 19680630 | N | P | | ASST. PROF. | BIO SCI | 12 | 1.00 | 0 | |
| | 19680531 | | | | | SEARCH DONE | BIOCHEM (S) | | | | |
| P | 19680531 | 19710630 | C | P | | ASST. PROF. | BIO SCI | 12 | 0.50 | 0 | |
| | 19710701 | | | | | NOT NEC.-CONTIN | BIOCHEM (S) | | | | |
| P | 19710701 | 99999999 | P | T | | ASSO. PROF. | BIO SCI | 12 | 1.00 | 0 | |
| | 19771101 | | | | | NOT NEC.-CONTIN | BIOCHEM (S) | | | | |
| P | 19771101 | 99999999 | P | T | | PROFESSOR | BIO SCI | 12 | 1.00 | 0 | |
| | 19860701 | | | | | NOT NEC.-CONTIN | BIOCHEM (S) | | | | |
| P | 19860701 | 99999999 | C | T | | PROFESSOR | BIO SCI | 12 | 0.65 | 0 | |
| | | | | | | NOT NEC.-CONTIN | BIOCHEM (S) | | | | |
| PD1 | 19860701 | 19890630 | C | N | | PROFESSOR | BIO SCI | 12 | 0.35 | 0 | |
| | | | | | | NOT NEC.-EXEMPT | ECOL SYSTEM (S) | | | | |

FPS02S ACADEMIC PERSONNEL DATABASE DATE: 10/12/87
STATUS SHEET PAGE: 2

NAME: CORNELL, JOHN C SSN: 123-12-3123
TITLE: PROFESSOR TENURE: 1971 07 01
DEPT: BIOCHEMISTRY (STAT) TERMINATED:
AA UNIT: BIOLOGICAL SCIENCES COLLEGE: AGR/LIFE SCIENCES

**********LEAVE HISTORY**********

| EFFECTIVE DATE | RETURN DATE | CHANGE STATUS DATE | LEAVE TYPE | PR. CRD E OR U |
|---|---|---|---|---|
| 1980 07 01 | 1981 06 30 | | SABBATIC LEAVE (FULL YEAR) | |
| 1985 07 01 | 1986 12 31 | | SABBATIC LEAVE (HALF YEAR) | |

**********ADMINISTRATIVE APPOINTMENT HISTORY**********

| EFFECTIVE CHANGE | END STATUS | UNIT/ TITLE | SUPPLE. PAY |
|---|---|---|---|
| 1983 07 01 | 1985 06 30 | BIOCHEMISTRY (STAT) | Y |
| 1985 07 01 | | DEPARTMENT CHAIRMAN | |

**********DEGREE INFORMATION**********

| LEV | DEG | YEAR | INSTITUTION | MAJOR/MINOR FIELD (S) |
|---|---|---|---|---|
| 2 | BA | 1960 | HARTWICK COLLEGE | POLITICAL SCIENCE & GOVERNMENT |
| 3 | MS | 1962 | CORNELL UNIV | BIOCHEMISTRY |
| 6 | PHD | 1964 | CORNELL UNIV | BIOCHEMISTRY |

DATE HIGHEST DEGREE RECEIVED: 1964
HIGHEST DEGREE RECEIVED: DOCTORATE

**********BOARD/EXECUTIVE COMMITTEE ACTIONS**********

| ACTION TYPE | ACTION DATE | ACTION | EFFECTIVE DATE |
|---|---|---|---|
| B | 1977 10 22 | PROM TEN FACLTY TO FULL PROF | 1977 11 01 |
| B | 1980 05 20 | ENDOWED PROFESSORSHIP | 1980 07 01 |

# COLLECTIVE COLLEGE REPORTS SYSTEM

Susan Juba

Peter Toro

Research & Development Office

Brookdale Community College

The purpose of this PC demonstration is to display the virtual ease of use and potential to computerize all of your research reports by name, type of analysis, report type, location, and major key words. This presentation will feature the Collective College Reports System that was developed by the Research and Development Office at Brookdale Community College. The flexibility of the system for single and multi-campuses will be explored, as well as, additional usages of this unique system.

The Research and Development Office at Brookdale Community College has been and will continue to be involved in numerous data collection efforts college-wide. Like many college campuses across the country, the role of the institutional research office at Brookdale has grown through the years in its level of importance, responsibility, accountability, and credibility for providing data. Like so many college research offices who aim to produce timely and meaningful results, the PC managed to enter our world. How did we ever get along without it? A question many of us ask ourselves, and yet amaze ourselves that we can't think back

to the days of 'BPC' (Before Personal Computers). Why is it then, with technology staring us in the face (as the PC literally sits on our desk), that we also wonder why it is so hard to stay afloat? The addition of our PC also brought with it an additional, yet unplanned for, work load. I believe now that was part of the package deal. A real bargain at any price! Our increased productivity as a result of our PC added to an already existing problem -- 12 filing cabinets overflowing; a research library consisting of 65 binders exploding at the seams; a hard disk already filled (in only 6 short months); and the continual phone calls and memos from all over campus requesting immediate and current information.

We stopped long enough to examine what had happened and realized we had created our own pitfall. At about the same time Brookdale applied for and received a grant to categorize Community/Society Outcomes in a Community College. While we knew that a number of reports/surveys had been done on our campus which addressed the outcomes issue, this reinforced what we already knew existed -- no centralized area for locating and maintaining college-wide data. This grant afforded us the right opportunity for this project to be studied and implemented. The Research and Development staff felt it was important for our office to be able to know if and when a particular report or project had been done on campus and then to be able to 'put our hands on it.' We also knew we had the responsibility to disseminate this

information to those areas of the college that have the responsibility for making institution-wide decisions based upon our data.

While it became apparent that an extraordinary amount of time was being spend "searching" for particular reports, we knew we needed to develop a mechanism for quickly being able to access appropriate information. Some system that, at-a-glance, would provide the right information to the right people at the right time. For example, if one wanted to determine what studies had been done on economic impact within Monmouth County, one could only search the listings of previous reports to determine if any study had within its title the words "economic impact". What would happen, however, to a study that dealt either directly or indirectly with this concept but that did not bear the words in the title? Therefore, a more appropriate approach had to be found that would allow all reports to be data based in such a way that would allow almost instantaneous access to their essential points. What resulted was the creation of the Collective College Reports System better known on our campus as the CCRS. The basis of the CCRS was to help optimize our efficiency.

We began our study with the following objectives in mind:

1. To review current processes and procedures utilized for the collection of data.

2. To analyze these processes and procedures for the purpose of consolidating all research and data collection efforts.
3. To assemble the results of these efforts in a manner that facilitates their use in the College's overall planning and decision making processes.
4. To communicate the findings to those audiences that would most profit from this information.

In addition, it was important to us that the program which was to be developed be sufficiently comprehensive and understandable so that users could use it to its fullest extent with relative ease. Also of concern, was that not every college has DBase III Plus, the primary driver of the system. In order to overcome this barrier, it was decided to purchase a compiler that would allow the programs developed to run on any IBM compatible microcomputer whether or not the DBase III Plus software package was installed. As a result, any college with IBM compatible microcomputers can now utilized the CCRS from the day of delivery.

The next step in the process was to identify areas of the college that produce reports that the Office of R&D felt relevant to be included in this central reporting system. Some of the offices that were visited included the Center for Business and Industry, Research and Development, Community Services, Career Services, Extension Services, Human Resources, and Community Development. For example, the Office of Extension Services conducted a survey of businesses

and residents in Asbury Park to determine the feasibility of establishing a learning center in the area. Career Services conducts numerous feasibility studies that are used for the determination of new academic programs. Within the past year, studies were conducted to assess the need for a high technology facility at Brookdale. A review of some of these studies and others led to the development of a coding strategy for this project.

In addition, it was decided to review the various coding strategies of such respected organizations as ERIC and NCHEMS. Many of the identifiers that were selected for Brookdale's use came from these sources.

After reviewing all the major sources, it was determined that the final program should allow users to enter the following types of information for each report:

1. Name

   This would represent a unique name given to each report. Sufficient room would have to be allowed to encompass most report titles.

2. Type

   Although this could be left up to the institution, it is recommended that this identifier be used to differentiate between reports that might be economic, societal, academic, demographic, political and so forth.

3. Location

As indicated previously, many reports might be housed in other offices or even campuses. This field will allow users to specify as many different locations as might be applicable.

4. Types of Analysis

Specifically, this refers to types and or levels of statistical analysis that could be used. Some examples include analysis of variance, analysis of covariance, frequency distributions, cross-tabulations, chi square, and t tests.

5. Key Word Codes

This is truly the heart of the system. Every report that is generated contains certain factors that are crucial for future decision making. For example, if one assumes that an appropriate outcome for a college is suitable employment for graduates, he/she might want to access all reports that deal with the placement and success of its graduates. Most assuredly, there are graduate studies that are done routinely. However, many institutions also conduct periodic studies that are not focused solely on graduates but that, as a side feature, ask questions relating to employment. For example, the college may be attempting to ascertain the feasibility of adding a new program. Part of the process might be to contact potential employers who already employ graduates in other fields. By developing a key word such as graduate and then using this in the categorization of both the

graduate studies and the feasibility studies, it would be possible to quickly access all studies that utilized this key word.

6. Dates

This would be a simple inserting of the dates covered by the study and/or report.

7. Comments

This area allows for the placement of further comments that describe unique aspects of the study or report.

After the above procedures were developed, the software package was developed by Brookdale's research associate, Peter Toro. What follows is a condensed version of the user's guide in addition to some sample screens for the Collective College Reports System. SPECIAL NOTE: One complete copy of the user's guide along with the appropriate system disk will be made available to any institution that would like to use it. An order form is included on the last page of this report.

Modified User's Guide

I INSTALLATION AND REQUIREMENTS

The Collective College Reports System (CCRS) should be used on an IBM Personal Computer system or 100% compatible machine.

Two versions of CCRS are available; one operates under the PC-DOS operating system while the other, which includes an installation program for monitor and keyboard configuration, operates under most generic MS-DOS and 100% IBM compatible machines.

The CCRS program requires PC-DOS or MS-DOS 3.0 or higher, a minimum of 512k RAM, a floppy disk drive and a hard disk drive unit.

II DATA BASE FILE MAINTENANCE.

To enter maintenance records, press the number corresponding to the type of maintenance to be performed from the CCRS Maintenance Menu. Input the particular code desired. If the code already exists on the data base, mode will be set to "CHANGE". If the code is not on the data base, mode will be set to "ADD". Duplicate and blank record codes are not allowed on the data base. During the "CHANGE" mode you will have the option to delete the current record when the message "PRESS <F10> TO DELETE" appears on the bottom of the screen. This option will be in effect as long as the current screen is in the "CHANGE" mode. Help windows are provided in all screen modes when entering input by pressing the "<F>" key. To exit from any maintenance module press <ESC>, control will then return to the main menu (figure 1.1). Report Type File Maintenance allows the input of a report type code and a report type name to describe what kind of college report(s) will be defined in the CCRS database. You may set up the codes any way you wish, but they should have some direct relation to the report type names used to describe the codes, for example, report type code = ACAD and report type name = ACADEMIC REPORTS.

Location File Maintenance allows the input of a location code along with the location name, address, city, state and zipcode of where a particular college report may be fcund. Codes should maintain a direct relation to the location name for ease of use as well as access when using the inquiry program. A good example of inputting a record in Location File Maintenance is, location code = LRC, location name = Learning Resource Center.

Analysis type File Maintenance allows the input of an analysis type code and analysis type name to help identify what type(s) of analysis were done in particular college reports. Again the analysis codes should be directly related to the type of analysis, for example analysis type code = CTT and analysis type name = Cross Tabulation Table.

Key Words File Maintenance allows the input of a key word code and up to twenty key word descriptors that help to identify certain topics of interest within particular college reports. The naming conventions of key word codes and key words should be relational as in the above file maintenances, for example, key word code = STUD and key words = STUDENT AFFAIRS, STUDENT PROGRAMS, STUDENT GRADES etc. After all of the Code Type Maintenance records (numbers "2" through "5" on the CCRS File Maintenance Menu) have been entered into the data base you may then begin to enter Report records under Report File Maintenance (number "1" on the CCRS File Maintenance Menu).

Report File Maintenance operates much like the other File Maintenance programs (numbers "2" through "5" on the CCRS File Maintenance Menu.) To enter a Report record (figure 1.2), enter the Report name. If the record already exists on the data base, mode will be set to "CHANGE". If the Report record does not exist on the data base the mode will be set to "ADD". Duplicate Report records are not allowed. During both the "ADD" and "CHANGE" modes "help windows" are provided for incorrect or invalid input to; report type code, report location code, types of analysis code and key word(s) code. These help windows provide a composite listing of the particular codes in question along with a descriptor or descriptors for correct input. Blank codes may only be entered for "types of analysis" and "key word codes". Blank Report names are not allowed. The "comments" field allows 156 characters of input within three (52) character input lines.

III INQUIRY AND DATA BASE LISTINGS.

To query the data base for general or specific Report records press number "1" (College Reports Inquiry) on the main menu. In the "inquiry" mode all fields may be blank, by pressing enter through each field, to incorporate a wide range of Report records. Note however the more fields that are entered for inquiry, the more specific or narrow the output will be. For instance, to search the data base for an academic report or reports that were done using a survey and contain key words such as; student grades, counseling,

education etc., you would first enter through report name. Next you would enter the report type code for "academic" which could be "ACAD". Now you would enter through location code (if you did not know the location of the report(s) in question) and enter the analysis type code for "survey" which could be "SUR". To complete the inquiry enter the key word codes for the key words listed above, which could be "STUD", "GRAD", "COUN" and "EDUC". After all selections for inquiry have been made, you will be asked whether the output is to be directed to the screen (figure 1.3) or to the printer in the form of a report. The program will now search the data base for all reports meeting the criteria listed above. Help windows are provided as in the "ADD" and "CHANGE" modes of Reports File Maintenance. A date range is also provided for selecting reports within a certain time period. All listings show codes and code descriptions of the file chosen from the CCRS File Reports Menu. The user has the option to either display the listings on the screen or send the listings to the printer in the form of a report. Number "2" (Locations Listing) gives the user the additional option to select criteria for listings i.e. address, city, state, zipcode etc.. as a means for filtering in/out in certain location areas.

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ACKNOWLEDGEMENT
The following acknowledgement is extended to Mr. Arnold Gelfman, Director of Special Projects and Planning at Brookdale, for his role in preparing the grant and its contents, a portion of which is included herein.

Figure 1.1

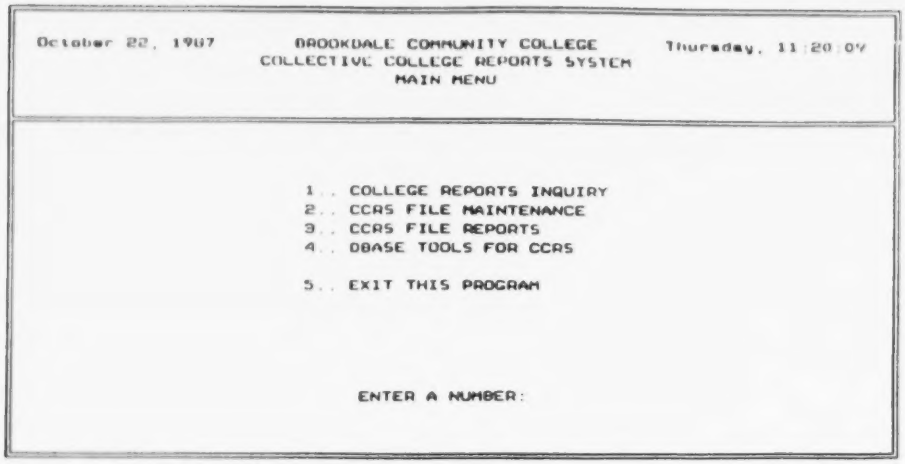



Figure 1.2

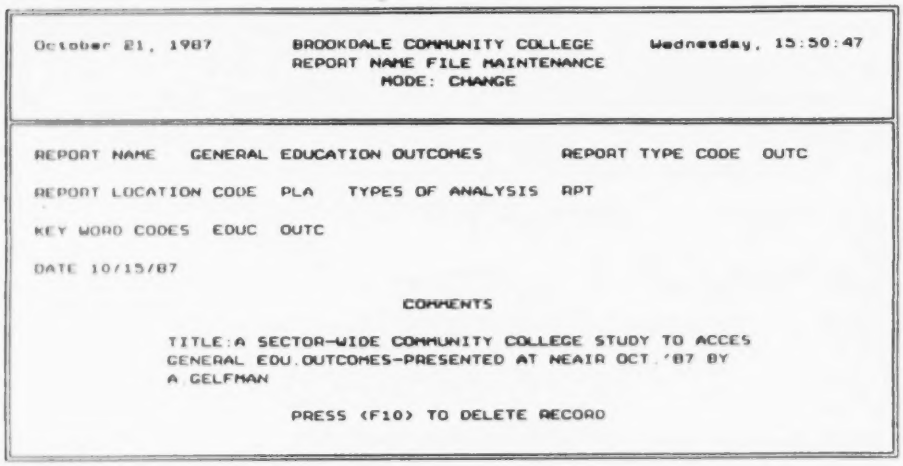
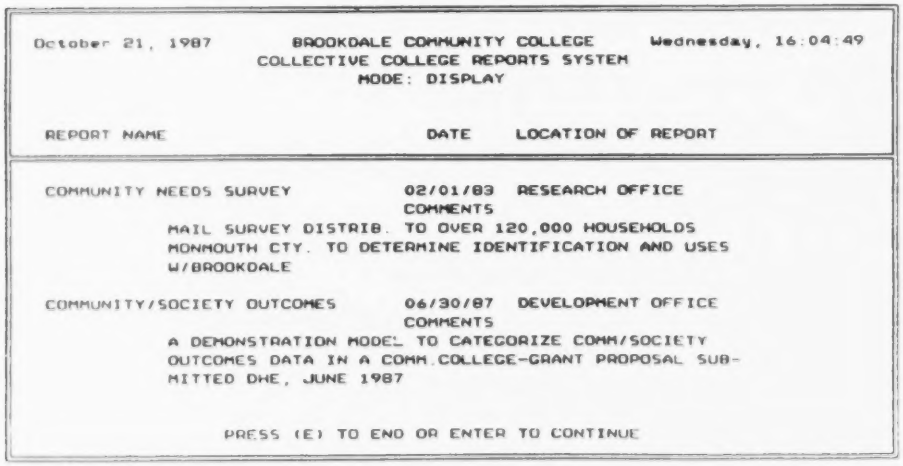



Figure 1.3



## CCRS ORDER FORM

To order a copy of CCRS, fill in the "SHIP TO" information, send a blank diskette (5 ¼" or 3 ½"), and a check for $5.00 to: BCC.

Mail requests to:

Brookdale Community College
ATTN: Peter Toro
Research Office
Newman Springs Road
Lincroft NJ 07738
(201)842-1900 ext. 452

Type of operating system:

PC-DOS [ ] MS-DOS [ ] Other [ ]

Type of Personal Computer:

PC\AT [ ] PC\XT [ ] Other _____

Type of Display Monitor:

Color [ ] B & W [ ] Monochrome [ ]

Type of floppy drive:

5 ¼" [ ] 3 ½" [ ] Other _____

* FILL IN BELOW *

SHIP TO _____

NAME _____

STREET _____

CITY _____ STATE ____ ZIP _____

COMMENTS\CUSTOMIZATION REQUESTS:

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# SYSTEM DYNAMICS MODELING with STELLA: MINORITY RECRUITMENT AND RETENTION IN A COLLEGE SETTING

Wendy F. Graham
Office of Institutional Studies
College of Human Ecology at Cornell University

System dynamics is a methodology for understanding certain kinds of complex problems. Problems that are candidates for this methodology are characterized by dynamic conditions and feedback systems. Simply stated, system dynamics involves quantities or variables which change over time. Examples from higher education include student enrollments, tuition revenues, microcomputer acquisitions, and so forth. The second distinguishing feature of system dynamics - feedback - refers to the transmission and return of information. The recruitment activities of admissions' personnel influence student enrollments and hence operate as a feedback device. Together with informational inputs from various sources, including the registrar, counselors, faculty, and housing and support services, they form a feedback system internal to the organization.

Unlike mental models which are the basis of most decision making, a system dynamics model is a formal representation of organizational behavior that is expressed in quantitative terms. In other words, it is a mathematical model that permits repeated experimentation to test assumptions about the elements in a system and their relationships. The underlying purpose of system dynamics modeling is to gain understanding of system behavior by simulating its operation under varied conditions.

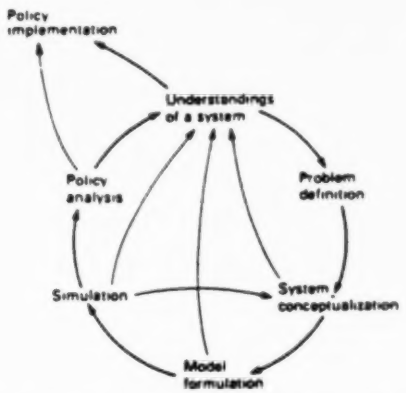
Formal models have two advantages over cognitive models. First, formal models are more explicit than the fuzzier mental models, and therefore lend themselves to experimentation. When a model is explicated, it is more open to criticism and reformulation, two activities believed to improve program theory. Second, a formal model implemented on a computer handles complexity with great efficiency and accuracy. Specific assumptions and interactions can be reliably traced through time. In summary, formal models, in which system dynamics is categorized, assist in explicating program theory and identifying a set of action alternatives to improve program outcomes.

The purpose of this paper is to acquaint the reader with the system dynamics methodology and to introduce other heuristics that can complement the system dynamics approach.

## THE STAGES OF SYSTEM DYNAMICS MODELING

According to Richardson and Pugh (1981), there are seven stages in approaching a problem from the system dynamics perspective: (1) problem identification and definition, (2) system conceptualization, (3) model formulation, (4) analysis of model behavior, (5) model evaluation, (6) policy analysis, and (7) model use or implementation. As illustrated in Figure 1, the modeling process is neither linear nor hierarchical. Rather, it forms a loop, emphasizing its iterative nature. The process both begins and ends with understandings of a system.

**Figure 1: Overview of the system dynamics approach**




The first four steps from Richardson and Pugh are elaborated in this paper. Minority recruitment and retention at a major northeastern university is modeled, as a case study to illustrate system dynamics simulation modeling. At times it will be necessary to mention STELLA, the computer simulation software used to model the minority student process.

### Problem identification

Two very broad guidelines are helpful in reducing the complexity of the problem definition. The first prerequisite is to have a clear purpose for the modeling effort. The second strategy is to focus on the problem and not on the system. Together these two guidelines act as filters to screen out details and focus attention on significant aspects of the feedback system. In other words, the modeler is saved from having to think about everything in order to think about something. These considerations become increasingly important as the modeler advances to conceptualization, and later, model formulation.

Statement of problem. In its simplest form, the problem facing universities today is recruiting and retaining minorities. During the 60's and 70's, colleges enjoyed substantial increases in minority enrollments. As compared to a decade ago, the percentage of blacks, hispanics, and American Indians in American universities is down, while representation of Asians is at roughly the same level. This decline

is attributed to fewer high school graduates among the declining groups, racial discrimination on college campuses, ineffective campus support services for retaining students, declining employment opportunities after graduation, and reduced levels of financial assistance.

Since 1980, minority enrollment in one college of the case study institution has increased from 14% to 16%. In numeric terms, a two percentage point increase translates to roughly 25 additional minorities in a student body of approximately 1200. A Minority Education Committee was convened to study the problem of minority recruitment and retention and to propose strategies for increasing the overall representation of minorities in the college. An ambitious goal of one-third minority by 1997 was prescribed by the committee. The question which arose was:

**How Many Minorities Do We Need to Recruit Each Year and Retain to Achieve One-Third Minority in the College by 1997?**

System conceptualization

Conceptual heuristics. McClintock (1987) summarizes several conceptual heuristics for clarifying program theory and identifying intrinsic problems. One such tool is metaphor analysis (Schon, 1979; House, 1983); it is important as a cognitive basis for how we generate or frame our definitions of social problems and programs. For example, the problem of minority retention in institutions of higher education in the United States can be viewed from a variety of perspectives. The concept of "critical mass" emphasizes the need for a forum made up of members of the same cultural heritage to foster friendships, share problems, and reinforce behavior that is critical to college success. Student associations have arisen to fill this need. "Cultural diversity", on the other hand, underscores the necessity of incorporating persons of color into the mainstream of activity by removing discrimination barriers. Programmatic implications include consciousness- raising, introducing cultural perspectives into the curriculum, and recruiting minority faculty. Metaphors relating to minority issues in college settings are scattered throughout organizational documents such as student service annual reports, committee documents, and college newspapers, and emerge through informal conversations and committee gatherings.

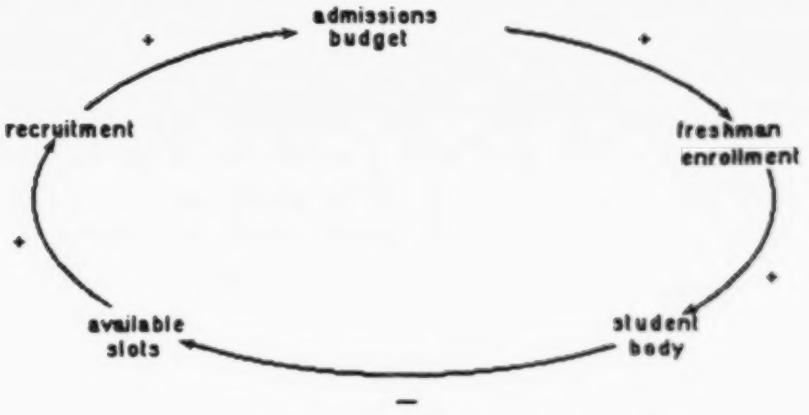
Structured conceptualization is a more formal activity for stimulating greater awareness of conceptual domains among program stakeholders (Trochim, 1985). The method consists of: (1) generating words, phrases, or sentences that have relevance to the program, (2) identifying groups of similar descriptors through a sorting procedure, and (3) analyzing the sort results using multidimensional scaling and cluster analysis to produce a concept map

that represents the location and groupings of the original descriptors. These maps are the combined symbolic representations of stakeholder's mental models and provide information about the structure of the program and problematic concepts.

These conceptual heuristics aid in clarifying program concepts and in defining the boundaries of the system. Causal-loop diagrams, which are sometimes referred to as influence diagrams or signed digraphs, begin to trace the dynamic underpinnings of the real world system being modeled.

Causal-loop diagrams. Causal-loop diagrams are conceptual "lego" sets made up of many interconnecting links. The individual links in such diagrams can be labeled to show whether the nature of the causal link is represented by a positive or negative correlation. Links with plus signs indicate that the variables at the opposite ends of the arrow tend to move in the same direction while a minus sign indicates an inverse relationship. The cummulative effects of a model's causal links give an idea of the character of the loop. A self-reinforcing system is referred to as a positive feedback loop and contains an even number of negative causal links. An odd number of negative causal links indicates a negative feedback loop. Positive feedback loops amplify deviations and destabilize, while negative feedback loops control and stabilize. Figure 2 illustrates the negative polarity of the admissions process.

Figure 2: College admissions showing negative polarity




The apparent simplicity of causal-loop diagrams is deceptive. Several suggestions may help the novice modeler from going astray (Richardson and Pugh, 1981).

(1) Think of variables as quantities that rise and fall, or grow or decline. Variables should be expressed as nouns rather than verbs. The actions are in the arrows.

(2) Feel free to include variables in the model that may defy measurement at the moment. You may decide to exclude these

variables later in the system dynamics model but inclusion in the causal loop diagram negates under-specification of the model.

(3) Identify the units of the variables in causal loop diagrams. Units help to focus the meaning of a phrase in a diagram and ease the transition to a system dynamics model.

(4) If a link needs explanation, disaggregate it -- make it a sequence of links.

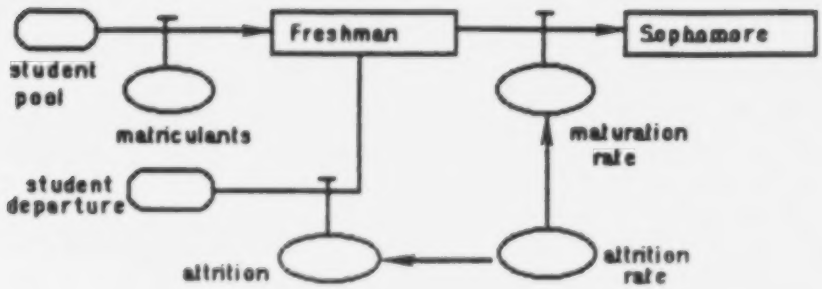
Once a problem has been identified and significant variables located, the modeler can explore interconnections among those variables and search for feedback structures through use of causal-loop diagrams. STELLA, or rate/level diagrams, capture more detail and match much more closely a complete, quantitative description of a model. Model conceptualization often begins with causal-loops and moves to rate/level flow diagrams and finally to explicit equations relating the elements of the system.

## Model formulation

**System dynamics terminology**. To understand system dynamics models, the would-be modeler must grasp the meaning of basic concepts such as levels (or stocks), rates, converters, sources and sinks, and input links. The word level is particularly intuitive since it invokes the image of the level of a liquid accumulating in a container. Levels are represented by tubs in STELLA diagrams. The flows increasing and decreasing a level are called rates and are pictured as stylized valves. Converters are a special type of rate that provide input to rates which, in turn, regulate levels. Input links depicted by arrows convey the signals or information that activate converters or rates and ultimately influence levels. Sources and sinks are quantities which flow into and out of a level. Their presence indicates that the real-world accumulations they represent lie outside the boundary of the system being modeled.

In Figure 3, for example, the level of the freshman class is controlled by the rate of matriculants drawn from the student source, while the level of the sophomore class is determined by the maturation rate of freshmen. Not all freshmen become sophomores. The attrition rate converter controls the freshman-to-sophomore flow through maturation rate. Students move out of the model through the student sink.

Figure 3: Flow diagram showing conventional symbols for levels and rates



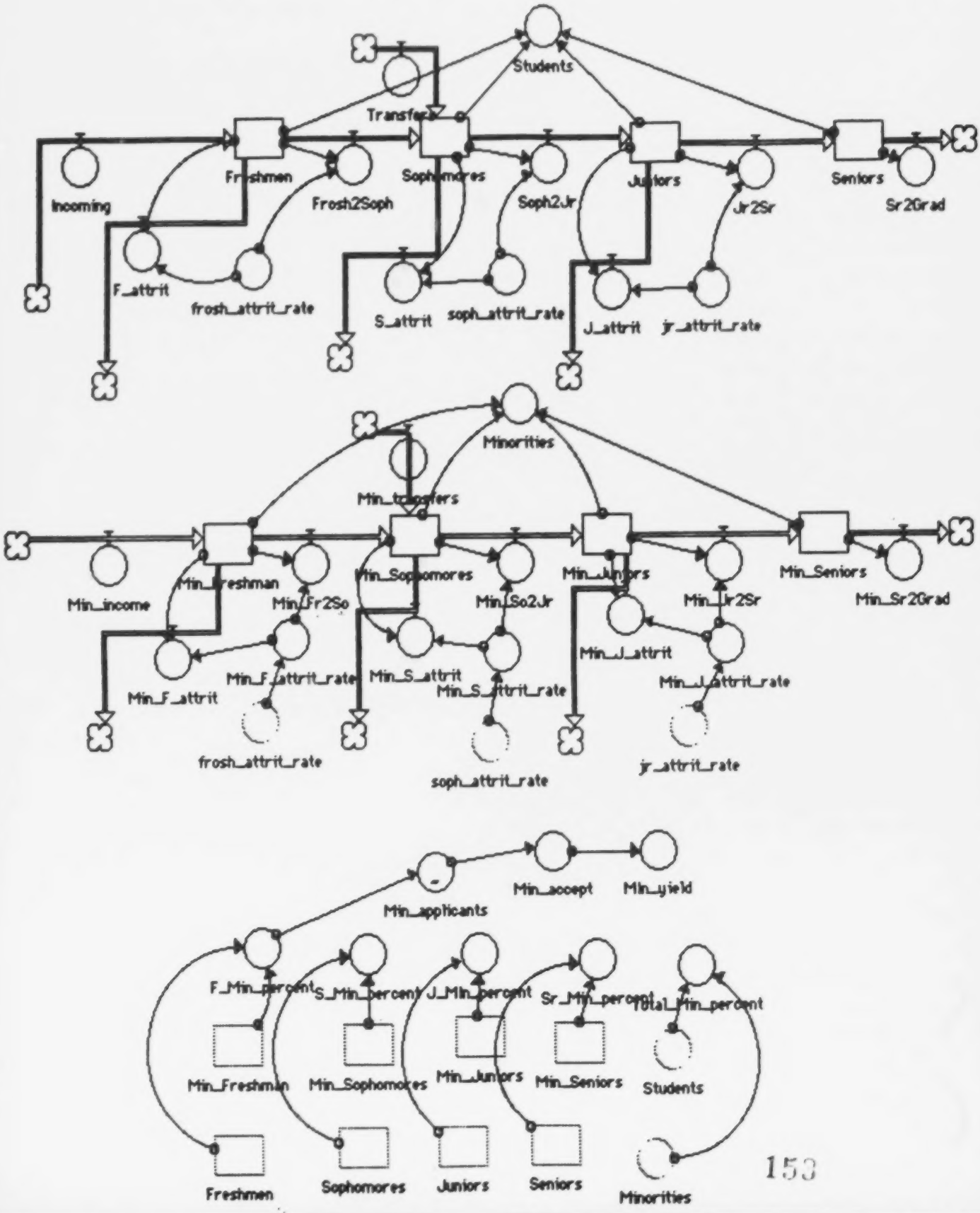

Defining the system boundaries. The goals of the Minority Education Committee indicate that the model should focus on at least two major concerns - recruitment and retention. There are a host of factors that influence the success of recruitment and retention programs. Some considerations are:

| Recruitment | Retention |
|---|---|
| -Admissions budget | -Student associations |
| -Admissions personnel | -Professional advising |
| -Recruitment costs | -Faculty teaching and advising |
| -College image | -Peer relationships |
| -Tuition costs | -Financial aid |
| -Marketing effort | -Academic support services |

For the sake of simplicity, and to answer the question of how many minorities do we need to recruit and retain to reach 33% minority representation in the college after ten years, only the issues of recruitment and retention are considered. Nevertheless, the model is still complex because it must simulate the flow of students over four years, it must model minorities and all students separately to track both numbers and percentages of minorities, and it must consider two sources of potential students - freshmen and transfers.

The STELLA model. The STELLA model is shown in figure 4. The top diagram tracks all students through the college experience, while the center diagram traces minorities. The bottom diagram calculates minority representation in each of the four classes and in the student population.

Figure 4: A STELLA Model of Minority Recruitment and Retention



There are no recipes for translating the model structure into equations. Several comments are offered to guide this formulation.

- The more a modeler knows and understands about the real world system, the better his chances for simulating realistic outcomes.
- Historical data, if available, can be simulated to determine the congruence between the model's outcome and reality. However, a match or mismatch with reality neither confirms nor rejects the validity of the model. A match simply provides reassurance that the model was properly specified.
- Every variable in the model should have a meaningful interpretation or counterpart in the real system.
- In every equation, the units of measure must be consistent. Terms added together must have identical units.

Values in the minority recruitment and retention model were set at 1987 rates as shown in Table 1. Although in the real system transfers enter as freshmen, sophomores, and juniors, the model shows all transfers entering as sophomores. The units of measure are people. Initial values and formulas for the freshman class are shown in Appendix I. Equation (7), represented by a graph, is the feedback structure in the model. The proportion of minorities in the freshman class varies between 20% and 40%; minority applicants range from 200 to 600. The inverse relationship specifies that as the proportion of freshman minorities declines, more minority applicants are needed to maintain ideal minority levels college-wide.

TABLE 1

ASSUMPTIONS OF MODEL

(1) Undergraduate student body = 1200

(2) Freshman class = 270

(3) Transfers = 100; all enter as sophomores

(4) Cohort (class) attrition = 30%

(5) Student flow simulated over four years

(6) Starting point is 16% minority in undergraduate population

Analysis of model behavior

Model formulation and analysis, though identified as separate stages, are iterative activities. As each of the pieces of the model is assembled, the behavior of the growing structure can be tested and reformulated, if necessary. This approach to model formulation generates insights into the relationship between system structure and behavior when a well formulated research plan

exists. However, like any research activity, fishing explorations with STELLA contribute little knowledge about behavior. To maximize learning, it is advisable to: (1) predict the model behavior in advance of testing, (2) write down hypotheses and compare them to observed behavior, (3) plan key experiments to test alternate hypotheses, and (4) reason through unexpected behavior.

Three hypotheses were stipulated at the outset of the experiment:

- Recruitment of freshman minorities would have the largest affect on minority representation in the college
- Recruitment of minority transfers would yield small gains in minority representation college-wide
- Retention of minorities would yield small gains

Simulations were run successively varying the rates of minority recruitment of freshmen from 20% to 40%, and fluctuating the rate of minority transfer recruitment from 15% to 30% (see Figure 5). The rate of attrition was varied from 0% to 40%. The major findings are:

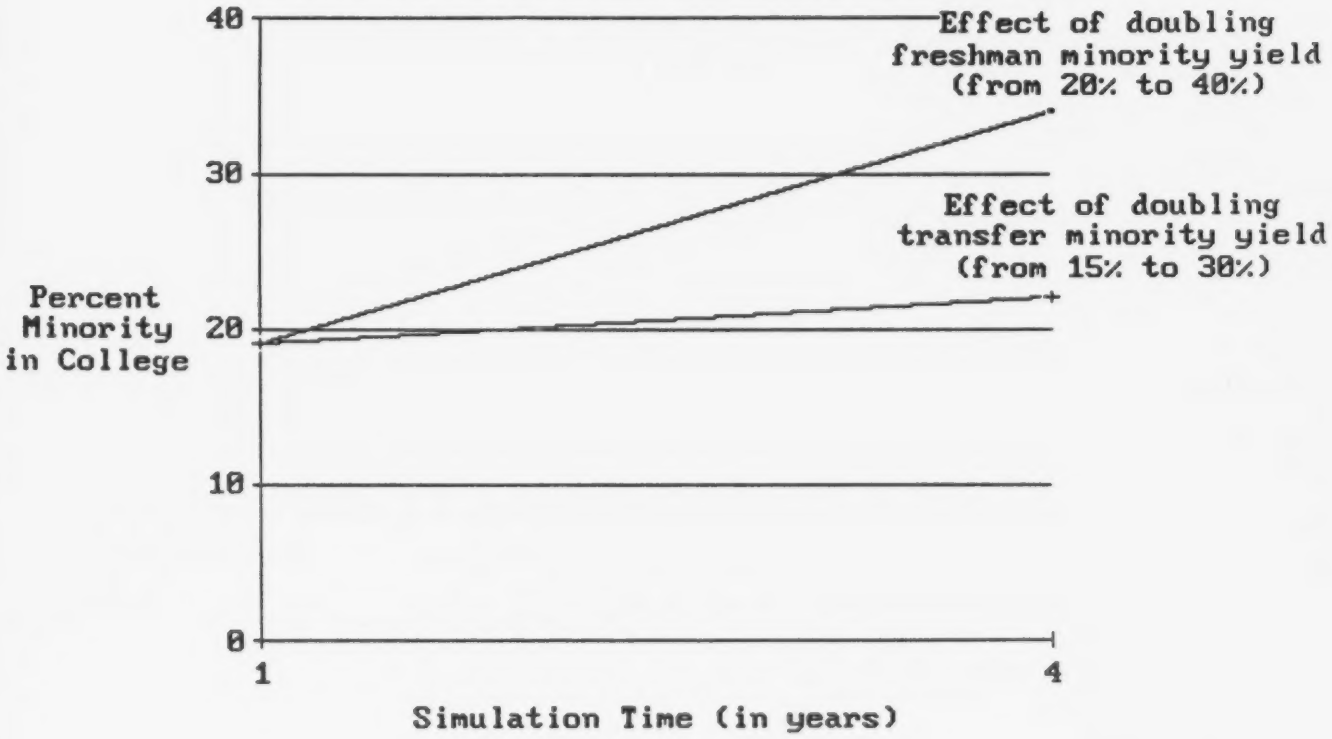
- The effect of doubling freshman minority yield, (from 20% to 40%), while holding transfer minority yield constant at 15%, resulted in the desired one-third minority representation college-wide over a four year simulation period.
- Doubling transfer minority yield, (from 15% to 30%), and holding freshman minority yield constant at 20%, raised college minority levels to 22% over the same time period.
- Rates of minority attrition ranging from 0% to 40% yielded no gains in the percentage of minorities in the undergraduate population.

## CONCLUSIONS

Behavioral systems that display dynamic behavior can be better understood using system dynamics methodology. This iterative approach to problem formulation, model specification, and analysis further learning about the structure and behavior of real world systems.

STELLA models provide an easy mechanism for the non-mathematician to perform tedious time-based calculations. Competing hypotheses can be tested to determine the probable effects of several policy choices. The deception of STELLA models is the ease with which parameters can be varied. Hence, as with all research endeavors, theory and understanding about the real world system must guide formulation of the problem, development of the system structure, and analyis of system behavior.

Figure 5: Effects of Recruitment
on Minority Representation within the College



## APPENDIX 1

## STELLA FORMULAS

(1) Incoming: 270

(2) Freshmen: 270

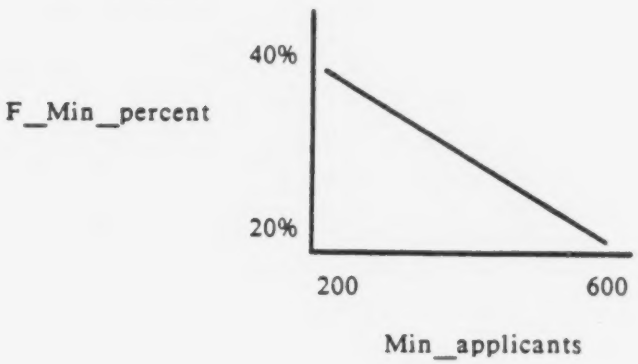
(3) frosh_attrit_rate: 0.04

(4) F_attrit: Freshmen * frosh_attrit_rate

(5) Frosh2Soph: (1-frosh_attrit_rate) * Freshmen

(6) F_Min_percent: Min_Freshman/Freshmen

(7) (graph):




(8) Min_accept: 0.70

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# Developing a School Planning and Institutional Research Office within a Complex University

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In Fall 1981, the School of Arts and Sciences at Penn established its first Office of Planning and Analysis. Since that time, the size and nature of that office have changed considerably. I suspect that those changes reflect a general evolution in planning and information systems in higher education overall. In this paper I would like to describe the formation and development of my office, to present some of the issues that I think to be general ones, and to point out similar examples from other institutions in order to generate some discussion of the evolution of planning and institutional research as well as its involvement with administrative information systems.

In recent history, the University of Pennsylvania has undertaken three major planning efforts, in 1924, 1952 and 1972. While all three had an impact on the future of the University, there was never a sustained planning process in between each major review. In 1972, however, the report by the University Development Commission included two extremely important recommendations whose implementation resulted in significant permanent changes in the structure, organization and outlook of the University from that time forward. The Commission stated that "Planning and evaluation must become part of our regular academic existence if we are to maintain our strengths and build a new future." and that "Fiscal responsibility in all

operational units, academic and non-academic, is an essential first step in all planning for the future..."

Like many other institutions in the early 1970's, financial exigency as well as the Commission recommendation led Penn to adopt new budgeting structures and processes and to activate a true long-range planning process. Thus in 1973-74, the University implemented a responsibility center budgeting system under which each school or responsibility center earned its own income in the form of tuition, research grants, restricted funds, and a share of the University's general income and was responsible for all expenses, both direct - salaries, benefits, current expense - and indirect - a share of the cost of general administration, student services, energy and facilities maintenance.

The plan was to encourage more fiscal responsibility in the individual schools and to place resource allocation in the hands of the individual deans, who were more knowledgeable than the Provost or Vice President for Finance and Budget about the strengths and weaknesses of their schools. While the new system did succeed in achieving better fiscal responsibility, it also resulted in the deans' becoming much more independent and powerful, and they often entered into an adversarial relationship with the central administration.

In response to the first Development Commission recommendation, the University and some of its schools established formalized planning structures and began planning processes. The University also established a central Office of Planning Analysis to support that process. For a long period of time, however, mostly due to the particular management style of the University's president and then to interruptions in leadership, the progress made in planning was fitful and uneven.

One other extremely important recommendation of the Development Commission was that the arts and sciences at the University be strengthened by unifying them in one School of Arts and Sciences rather than being scattered as they were in the College of Arts and Sciences (the men's undergraduate college), the College for Women (the women's undergraduate college), the Graduate School of Arts and Sciences, and the College of General Studies (the arts and sciences' continuing education and evening division), with the social science departments placed in the Wharton School of Business. Thus 1974-75 marked the beginning of a unified School of Arts and Sciences at the University of Pennsylvania.

The administration of the new School included an Associate Dean for Budget and an Associate Dean for Instruction and Academic Planning. Both of those associate deans took responsibility for supplying information in support of decision making, and the Associate Dean for Instruction and Academic Planning actually convened and chaired an SAS planning committee. Most of the information was gathered by hand, and the planning committee ceased to exist after making proposals for the University development campaign in 1975. After 1978, because of continually changing leadership in SAS, both the positions of Associate Dean for Instruction and Academic Planning and Associate Dean for Budget were eliminated through attrition, and planning and information in support for planning was greatly curtailed in the School of Arts and Sciences.

When he became President of the University in February 1981, Sheldon Hackney began instituting significant changes in the the major decision making structures of the University. He focused power in the academic sector by shifting budget responsibility from the Vice President of Finance and

Budget to the Provost and created a new faculty/student Academic Planning and Budget Committee with the Provost as it's Chair, to review the budgetary policy within the context of long-range planning.

Shortly after becoming Provost in Summer 1981 Tom Ehrlich began setting general University goals which would then form the context for School plans. He made it clear to the University community that he expected each school within the University to produce a five-year plan which would be reviewed and approved by the Academic Planning and Budget Committee as well as the Provost, President and the Board of Trustees. Given their greater financial independence and responsibility and this new mandate to proceed seriously with strategic planning, the largest schools in the University quickly developed a much greater need for planning expertise as well as support and information, and staff began to be hired for that purpose.

It was at that time that I was asked to organize the SAS Office of Planning and Analysis. The first year the office consisted of a programmer analyst, one part time programmer, and me. I spent most of my time proposing structures and processes by which we could conduct long range planning in SAS and gathering appropriate data to be used should a planning process begin. My office also provided computerized information to several of the SAS administrative offices to support their day-to-day functions. As time went on, we began to design small systems for them as well so that they could automate various pieces of their operational activities. The Dean of the School of Arts and Sciences supported my efforts but remained sceptical, suspecting that planning was simply a fad.

The following year, under an acting dean, SAS began a planning process which was managed and supported by my office. That process continued through

a second year under a new dean. As the process progressed, it became clear that more and more information was necessary to support the process and that this information was often missing from our data base. In the undergraduate student area especially, we realized that we did not possess information in an appropriate form to perform our operational functions properly, to say nothing of our analytical needs. In 1984, we received funding to design, develop and implement a totally integrated office automation/student data system for the College Office. It was through that project that my office officially took charge of all administrative information systems in the School of Arts and Sciences.

Because of our new responsibilities, we added a new systems analyst to our staff. The design and development of the College Information Management System marked the beginning of a new era in administrative systems development at Penn. It was the first system in which the project leader was outside UMIS (University Management Information Services). It was also the first project designed using ADABAS, the University's new data base system. It was the first system which included facilities for user updating of central files. The project was extremely difficult and fraught with many problems, but it did lead to a revolution in user involvement with the development and control of central administrative information sytems at Penn.

As the College Information Management System developed, other members of the SAS administration expressed the desire to have comprehensive information systems as well. In addition, more and more departmental administrators wanted to use microcomputers for their work. Since our office was the source of supply and support for all administrative microcomputers for SAS, we had

to add a new programmer to support end users and to design systems on the micros for the academic departments.

Virtually all of our efforts in administrative information systems development have had as their main goal the provision of more timely and accurate data for the support of the planning process as well as the necessary operational support. Because the School of Arts and Sciences is the biggest school in the University, we had a much greater need to use computerized information systems, and we needed much greater access to the data already maintained on the University's administrative mainframe computer. Therefore, my staff and I interacted extensively with members of the staff of UMIS and with staff in the various central administrative offices, such as the Registrar, the Bursar, Admissions. Over time we became much more demanding of the availability, accuracy and timeliness of centralized data. We also began to work closely with the central Office of Planning Analysis to share data and create joint analytic reports.

In Summer 1985, a new Dean with a real commitment to planning took over the School of Arts and Sciences. My office then began the design and support of a whole new planning process which culminated in the approval of the SAS Five-Year Plan in May, 1987. That plan is now being modified annually and used as the basis for departmental annual action plans, for departmental academic reviews and for budget negotiations between the Dean and the departmental chairmen as well as between the Dean and the Provost.

Since the School of Arts and Sciences is a University responsibility center, its planning must include academic, financial, physical facilities, capital budgeting, and fund raising plans. It also includes a plan for academic and administrative computing and data communications within the

context of the whole University plan. The SAS Office of Planning participated heavily in all of that planning and managed most of it.

The more the new Dean became involved with planning, the more he realized the need for accessible, accurate and timely data. However, it was clear that the accuracy and timeliness of centralized data depended not only on the automated information systems, but also on the understanding and responsibility of tens of people who supplied data to those systems. In order to support those people and to assure a certain level of responsibility, our office established and maintained a number of control systems and training programs. As we took on these more diversified responsibilities, we added a planning assistant to the staff and changed our title to the Office of Planning and Administrative Information Systems.

The University has recently purchased software packages for new central information systems: in Personnell/Payroll, in Student Financial Aid, and in Registration and Student Records. Our office represents the School of Arts and Sciences in user involvement with the modification, implementation, and administration of those systems so that they will best fill our needs and goals for the future. Our office not only represents the needs of the School, we also must purchase and install the necessary hardware to run the new system and train the responsible individuals in each department and administrative office on the use of the new systems.

Our office has thus grown from a staff of 2 and 1/2 to a staff of 5 and 1/2. Our responsibilities have increased enormously from the production of quite tentative proposals for a planning process and the supply of a limited number of computerized reports to quite broad responsibilities involving all forms of planning, management and control systems, and the design,

development, maintenance of local administrative information systems as well as heavy participation in the modification of new central information system packages. We are also very much involved in University and School decisions about data communications and electronic mail.

There is no question that one of the major influences on this broad growth of our office has been the new technology in computing. The development of microcomputers and the accompanying sophistication of users made it clear to those in positions of authority that decentralized offices could excercise much greater independence in the gathering and maintenance of information for decision making. Those individuals and others then began to question the traditional structures in administrative computing. Those structures have changed enormously at Penn and elsewhere but not without a great deal of pain. We have all had to deal with the difficult questions involving ownership of data, data administration, security, training, and the joint development of application software. Individuals in institutional research are, I think, particularly apt in dealing with many of those issues, because they understand so well the nature of their institutions and the institutional needs for information. However, individuals in central institutional research units in large institutions need the help of the appropriate individuals in decentralized units to really understand the detailed needs.

Advances in technology have also made it possible for institutional researchers to share data in a timely and useful fashion. Certainly, in my office, we share more information than ever before with the central planning office, with planning officers in other Schools in the University and with our colleagues in other institutions. This data sharing can only enhance our

decision support systems. We have also begun to share with other Schools in the University as well as outside the University ideas and information on the design of new information systems. This sharing has allowed us to provide more and better information without additional human resources.

The changes in our office reflect general trends in the following ways. First, planning became a formalized function in institutions of higher education only in the early 1970's and has been developing at a relatively rapid pace since then. Second, planning and institutional research have recently become decentralized functions in many institutions. More and more universities have not only school planning offices or at least officers but also planning/institutional research staff in many central offices, like the registrar, admissions, human resources, financial services, who interact with each other more or less well, depending on the insitution. The School of Arts and Sciences at Cornell University has a planning operation quite separate from the central Office of Institutional Planning and Analysis. The University of Rochester has a separate office of research and information systems within its vice presidential area of enrollments, placement and alumni affairs. The Office of the Vice President for Arts and Sciences at Columbia University maintains its own planning and analysis operation.

Third, planning/institutional research staff have become much more expert in computing and interact to a much greater extent with administrative computing units at each institution. They worry about access and accuracy of data, about data administration, about new information management systems, and about decentralized input of data. At the University of Kansas, for example, the Office of Institutional Research maintains responsibility for data administration for the university.

Finally, the university management information units themselves are changing enormously and are thinking more about planning, decision support systems, user interaction and support, and information data bases. In fact, in a number of institutions administrative computing and planning/institutional research are directly connected through the same management. Carnegie Mellon, the University of Miami, and the University of Kansas maintain such structures. While this is not the case at Penn, we just completed a substantial planning effort for our management information systems undertaken by planning/information officers across the campus, and the Executive Director of University Management Information Services has an advisory group consisting again of planning/information officers from the individual schools in the University.

Planning in a school office as opposed to a central office, especially in a decentralized university, is both challenging and rewarding, because the school planning office often has broader responsibilites and, at the same time, is much closer to the offices that supply the information to the central systems. Therefore, we have a greater understanding of the details of day-to-day operations and data input and have increased opportunity to change procedures in order to improve the quality of the data we use in decision support. The school planning office is often also much closer to the users of institutional information systems and therefore understands their needs better than a centralized office would. Because of this knowledge, it can better guide the development of certain aspects of new institutional information systems.

The challenge for a decentralized planning/institutional research unit is to maintain contact and cooperation with appropriate units across the

campus. The institution can get the most benefit out of this decentralized structure only if the separate units cooperate with each other in all areas. The best way to overcome the temptation for competition rather than cooperation is the support of a strong leader and a forum for the separate planners to meet and share ideas and problems. That has happened to some degree at Penn but not enough, and I'm afraid that again Penn's experience is a reflection of general situation across institutions.

The changes I have outlined here serve to indicate that the role of the planner/institutional researcher in higher education is becoming much broader and much more influential. It is important for us all to understand those changes in order for us to take best advantage of them and to serve our institutions well.

# PLANNING FOR STUDENT ENROLLMENTS, BUDGET, AND FACULTY WORKLOAD -- THE INTERFACE OF FINANCIAL AND ACADEMIC POLICY IN A LARGE COLLEGE

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## 1. Introduction and Background

The College of Business Administration (CBA) is now the largest college within the largest private university in the United States. About 1,200 courses are offered annually to over 6,000 students across nine undergraduate and graduate programs in the College. Over 120 full-time faculty, and almost as many part-time faculty, teach throughout these programs.

Despite its size, the College is not departmentally but centrally coordinated. The Dean's Office must accurately project enrollments, plan course offerings, and justify an instructional budget early in the previous academic year in order to plan for the financial and staffing needs of the College. Those forecasts -- because so much depends on them -- are much more than an academic exercise; they represent applied institutional research.

Certainly the very nature of institutional research is "applied," but only occasionally do the results have automatic consequence. Conclusions, for both rational and political reasons, may be influential. However, infrequently is there an a priori agreement to implement or otherwise apply the findings to policies of the institution. This is one of the differences perhaps between research and planning, which is concerned more with

the role of data in a decision process than with the abstract meaning or ideas that data suggest.

The first stage in developing this a priori acceptance of the findings is to establish a legacy of credibility: a demonstration that, in fact, the methods and results are so predictably accurate, honest, and clearly presented that they should be employed for decisions of a significant magnitude.

In the College of Business Administration, our goal is predict enrollments within two percent, to deviate from our planned course offerings by less than five percent, and to fully utilize our budgetary resources by accurately anticipating and justifying our staffing needs almost a year in advance.

The College, in fact, has uniquely negotiated a dynamic, zero-based budget in which each year the staffing of the College is re-justified on the basis of projected student credit hours. The College, then, must manage that budget -- and live with the anxiety of uncertainty -- to deliver the various degree programs and adequately offer the appropriate number of courses in each area.

A history of sound planning can have its rewards. The College has recently used its mastery in academic planning to implement the first stage of a teaching load reduction by manipulating a series of factors, such as class size. Partially because of the credibility the College has established in managing its resources, the University administration has recently made a major budgetary commitment to further reducing teaching loads.

The goal of this paper will be to examine academic planning so that ultimately a College can manage its resources most effec-

tively to meet the needs of students, faculty, and a central administration. Doing so is both an intellectual and political undertaking, in that credibility is established not only on the basis of the accuracy of the data but also the honesty, integrity, and persuasiveness of the planners themselves.

2. Enrollment Projections and Budget Planning

Northeastern, like many private institutions, depends on its tuition revenues to supply the funds with which to operate. At least within the College of Business Administration, the "contribution" (that is, the portion of the revenue that is not absorbed by operating expenditures) is expected to remain constant. Operating budget must fluctuate proportionally to the income the College can generate. Thus, projecting student enrollments is a very important and sensitive exercise. Factors must be constructed and validated to anticipate new students, attrition, and course enrollments.

The College graduates about the same number of undergraduates as are admitted as freshmen. However, only about half of the students stay for all of the five years of the undergraduate program. Thus, transfer students, both from within Northeastern and from other institutions, are integral to forecasting students and enrollments.

Beginning over a year in advance, we maintain rolling forecasts of undergraduate enrollments by student year. Because of the continued demand for business, we can negotiate the freshmen target with the Admissions director and be assured that at least that number will be provided. Two multipliers are then critical:

1) the percentage increase or decrease that can be expected between student years, as the result of the attrition of students and their replacement by new transfer students.

2) the average number of business courses taken for each of the five years -- a factor very sensitive to curricular changes and the vacillating appeal of non-business courses as electives.

On the graduate level, tracking the student pipeline is much more difficult. A shorter program means that forecasts are much more sensitive to changes in the numbers of new students. While about a quarter of the MBA students are full-time, allowing for some degree of certainty about their enrollment, part-time students can extend or compress their academic year in ways difficult to predict. In addition, the graduate student market is very sensitive to changes in the economy: as jobs are more plentiful, MBA enrollments, particularly for full-time programs, will suffer.

Thus, MBA forecasts are less mechanical and more intuitive. But because graduate students are enrolling exclusively in business courses and represent about one-third of the 130,000 student credit hours of the College, their enrollments are critical to the revenues of the College.

Once student credit hours are anticipated by program, faculty credit hours must be projected. This adds a further variable -- average class size -- which is a negotiated, and not an empirical figure. The College has established its theoretical class size of 35 for undergraduate and 25 for graduate courses. The College is free to manipulate those averages to conserve resources and increase the teaching "productivity" of faculty.

Student credit hours divided by the negotiated mean class size determines the theoretical amount of faculty needed to deliver the student credit hours we anticipate.

Another negotiated figure is the portion of full-time faculty teaching we can offer. It is assumed in the budget that 85% of our courses may be taught by full-time faculty and the rest at prescribed part-time faculty rates. Likewise, we can and do manipulate this ratio internally by voluntarily lowering our full-time coverage to provide release time for faculty research.

The process next provides for a standard, but not prescribed teaching load for full-time faculty. Thus, we now have a number of full-time faculty the College may hire -- which is "zero-based" in that the process begins with no budgetary or staffing assumptions and could very well result in a faculty size that is higher or lower than previously. In a College of over 120 tenure-track faculty (where over two-thirds are not tenured), we can live with this uncertainty.

Faculty size has its corollaries: secretaries, recruiting and moving expenses, and office space are variable costs that fluctuate with the number of faculty we justify. Universities are labor intensive and, thus, labor costs are presumed to be almost fixed in nature. This College, however, lives without this complacency: the entire budget of the College, by being zero-based, does not presume that any line item is sacrosanct.

This microscopic process is used to produce what is ultimately only a gross budget figure. The College is not held accountable for the nuances of the formula, only for the bottom

line of the budget. Once that budget is approved, the College is free to reallocate resources to hire more or less faculty, deviate in average class size, determine the standard faculty teaching load, alter the ratio of salary to operational expenses, and pay new faculty whatever we deem necessary -- the only stipulation is that we stay within our budget.

3. Course Planning and Budget Planning

Once the College knows how many faculty lines will be funded and how many courses will be offered, faculty recruiting can occur. We add the incremental lines, if any, to an anticipated number of replacements. Normally faculty turnover is about 3% beyond those on terminal or visiting contracts. Those lines are then allocated by department based on the projected full-time faculty coverage in each area. Given the unique sellers' market in management education, where there are four openings for each new doctorate, the College often hires on the basis of opportunity rather than specific need.

We begin the commitment to course offerings in the winter prior to the next academic year, by prescribing the number of sections of required courses and electives to be offered. As faculty present their teaching and scheduling wishes, the department chairmen assign faculty and propose which electives to offer. Staffing and scheduling goes through numerous, seemingly infinite, iterations as changes and their implications are processed. Faculty, chairmen, and program directors are continually consulted as the wishes of each are balanced. Ultimately, com-

mitments are made to students as schedules are printed and registrations are conducted.

Faculty availability, interests, and expertise have to somehow match the curricular needs of the College. Course offerings must reflect the enrollments that have been projected, the resources budgeted, and various student trends we envisage. Past enrollment data provide a general inkling of what student behavior can be anticipated.

Students tend to deviate from the lockstep assumptions of a curriculum in ultimately consistent ways. For example, when a quantitative methods course -- a prerequisite for statistics -- was removed from the program suddenly the statistics enrollments increased -- because students no longer felt as inundated with mathematical courses and the need to postpone statistics. Likewise, when a new course is added to those required (as has occurred with a new business modeling course and an upper-level writing requirement both added to the third year), the expected number of students does not immediately materialize, because students insist on deferring the course (particularly if not a prerequisite for another requirement) until perhaps the rude awakening of the senior year.

Thus, the allocation of faculty credit hours to the various course offerings relies on trial-and-error (commonly called preregistration), history, and judgment -- and less so on sound objective planning. Anticipating popularity is very much a function of subjective factors that influence choice (reputation of instructor, timing of the class, etc.). The planner can be

Machiavellian and schedule the popular course and instructor at a traditionally unpopular time (or visa versa) as a device for leveling enrollments. Otherwise, the institution must either accept great variations in course enrollments or insist that students live with closed courses (or canceled ones at the other extreme) and the need for level enrollments.

Our faculty culture requires that enrollments not exceed commonly accepted capacities. Students respond by taking preregistration very seriously. The administration balances the needs of the two constituencies by respecting the limits of classes while almost guaranteeing the student a place in a section of the course of interest. The quarter system coupled with cooperative education provides the unobvious benefit of advanced preregistration; students often preregister six months in advance of the term because of an intervening work assignment. Thus, we use the data of registrations to add and delete sections. If the initial, overall planning has been accurate, we still stay within budget as we respond to student demand.

Course scheduling requires more than accurate planning. Responsiveness to faculty means preparing their teaching load so that their courses will predictably be offered with adequate but not excessive enrollments; students require that the system provides seats in the classes they choose; and the budget requires that the College responds to its constituencies economically and responsibly.

4. Instituting a Teaching Load Reduction

This intricate process assumes several factors that are in fact dependent variables. Historically, the College has voluntarily lowered its full-time faculty coverage from the budgeted 85% to about 60%, and raised the average class size by about four students. The savings from these measures have released tenure-track faculty from about one-eighth of their teaching for research. Any cost in instructional quality, while difficult to measure, is the price paid for higher faculty morale and research output.

This year we are implementing a dramatic experiment in course planning by cutting about ten percent of the courses, in spite of a modest increase in enrollments, to provide faculty with another one-eighth teaching load reduction. Faculty were given a choice of this reduction -- which meant accepting a higher enrollment ceiling and greater administrative latitude in canceling small classes -- or the traditional assurance that teaching commitments would not be especially vulnerable to enrollments. The CBA faculty unanimously voted for the workload reduction and the scheduling volatility it mandated.

In fact, little of this volatility has occurred. The anticipation of a strict cancellation policy has created more prudent planning. Faculty, for example, are now more adverse to the personal risks of encouraging what might be an unpopular or excess elective. The Dean's office planned the overall schedule more conservatively and was able to reap the savings necessary for the workload reduction in advance without having to depend on canceling courses.

Faculty, by teaching more students over fewer courses, could have a more manageable schedule. But the greatest reward for this experiment has been the University administration's response. Our willingness to use our own means managing resources became the first stage of a new direction for the College. The next stage will be a major infusion into next year's budget, the largest the College has ever received, to improve the salaries of faculty and provide more release time for those active in research. Following this 14% increase in the CBA instructional budget, the College administration and the Provost's Office will begin a joint effort to recast and simplify the now intricate forecasting and budgeting process. The President and Provost have been persuaded that the College not only warranted this commitment of funds to contend with the pressures of the business academic market but can effectively manage this opportunity to continue to grow and improve.

5. Conclusions -- Decentralized Planning in a Large University

Whenever possible, planning should be conducted on the local -- that is, college -- level. The college leaders are in close proximity to trends and can provide the story behind the numbers. Since resources are often allocated and managed within a college environment, planning can provide the basis for allowing the unit to master the factors under its control and shape its own destiny.

However, a decentralized locus of control is not easily established. The college must convince its central administration

of its credibility. Firstly, credibility requires accuracy -- a record of performance -- to persuade the institution's leaders that a history of successful forecasts justifies confidence in the future of that instrument for forecasting. Secondly, the college must demonstrate that it knows itself better than outsiders ever could. Thirdly, the local leaders must be scrupulously honest in forecasting. Even though particular projections may protect or enhance resources in the short-term, the enlightened self-interest of the college requires the appearance, if not the reality, of objectivity.

Over the past decade, the College of Business Administration has always projected enrollments within two percent accuracy, and, as importantly, always underestimated at the risk of losing incremental budget. However, this "lowballing" has furthered our reputation as objective and reliable sources of planning data. While not as disinterested as the University's offices that also have forecasted enrollment trends, the College has been much more accurate. Local and centralized planning must overcome the often adversarial and political problems that can occur.

Fourth, presentation is often as important as accuracy and honesty in validating a decentralized planning process. It is the duty of the localized planner to educate those outside the unit to what the data mean. Self-awareness is only effective in establishing a position within a university context when successfully communicated.

Controlling one's own destiny is the ultimate purpose and goal of planning. Institutional research, forecasting, and strategic planning occurring on a decentralized basis will only strengthen the ability to anticipate, adapt, and innovate.

# ARE THERE TUITION CONSTRAINTS IN YOUR FUTURE? RETROSPECTIVE ANALYSIS AS A GUIDE TO THE CONSEQUENCES

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## ABSTRACT

From 1960 through 1980, student charges at most private colleges and universities exceeded inflation, but rose in pace with family incomes; since 1980 they have risen considerably faster than either inflation or families' ability to pay. Speculating that the era in which increased costs could easily be passed on is coming to an end, one private university looked back to see what it had done with the incremental real revenue as a guide to what it might not be able to do in the future.

## OVERVIEW

From 1960 through 1980, student charges at Tufts and at other leading private colleges and universities rose at rates that were faster than inflation, but remained about even with families' ability to pay. The charges rose in real terms, but so did family incomes. Since 1980, however, charges have risen far faster than either inflation or ability to pay. This is a **new** phenomenon, and it has been noted by students, parents, and government officials. (See Charts 1 and 2.)

There has been little reason for the best colleges to keep charges down. They had many good reasons for wanting the added revenue, including catching up on long-depressed faculty salaries and deferred maintenance, reequipping labs, computerizing, improving information support, and the like. They discovered that there were enough families that wanted to send their kids to the best schools and were willing to pay the going rate. And there was enough grant or loan money around to permit the institutions to continue enrolling classes from diverse backgrounds.

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Note: This paper draws heavily on material prepared for an internal Tufts study and subsequently presented to the 1987 winter workshop of the Tufts-EDUCOM Data-Sharing Project.

Chart 1: Tufts Tuition & Fees and Total Resident Charges
PCT of Nat. Median Family Income and Disposable Personal Income

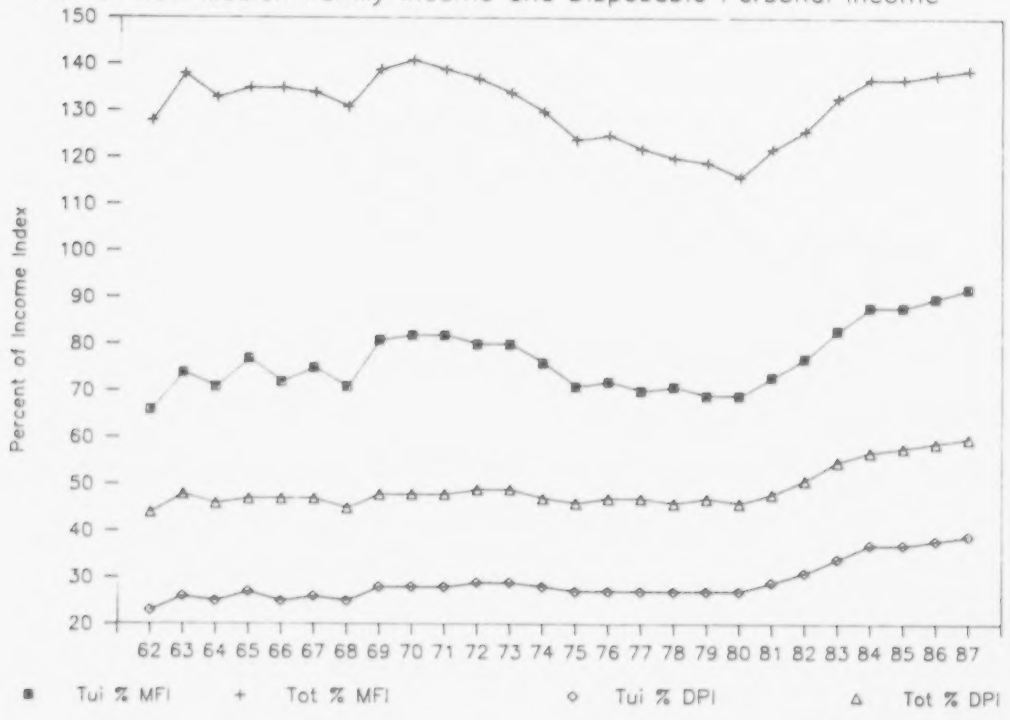
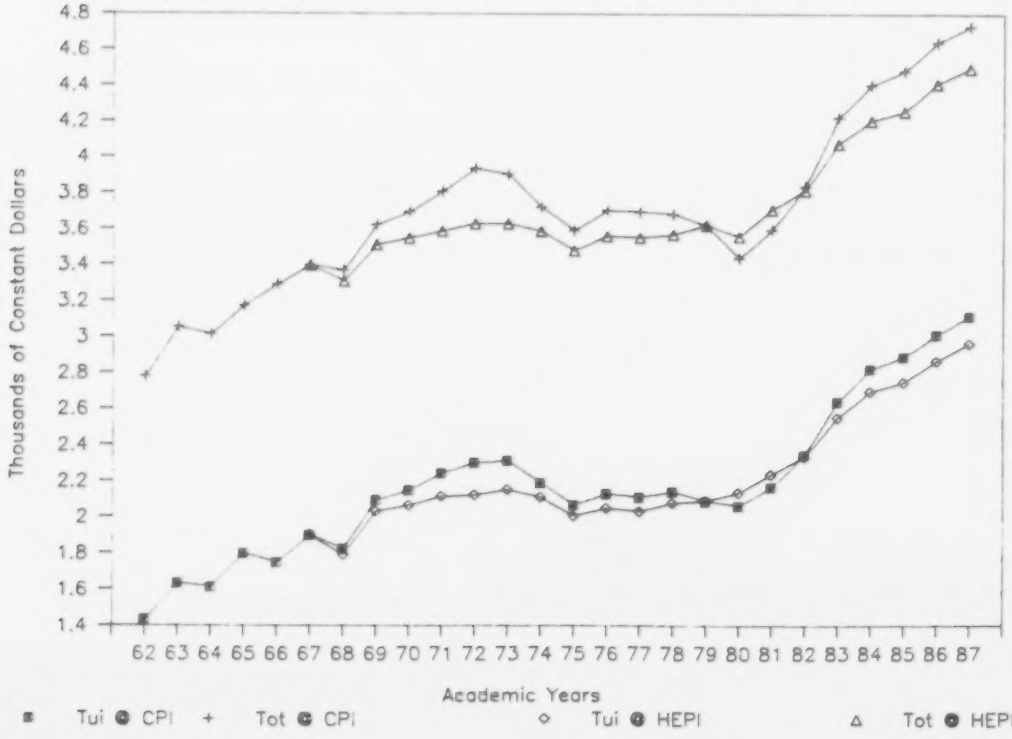



Chart 2: Tufts Tuition & Fees and Total Resident Charges
In Constant 1971 Dollars, Based on CPI and HEPI



Countervailing pressures are now emerging. Federal aid is being restricted and, if deficit reduction becomes a more serious federal priority, will decline further. The demographics are catching up with a number of the less prestigious colleges that would otherwise follow the lead of the top ones; deeper and deeper tuition discounting is evident. In the health professions, declining pools are becoming worrisome to all the schools; freezes or limits on charges are common, as are reductions in enrollment. The gap between public and private tuitions is widening, and more parents question the value of the incremental cost of private education. Finally, public attention has been sufficiently focussed on the issue that some senior administrators and boards of trustees are beginning to be more cautious about the psychological market effects of continued substantial escalations.

If in fact private colleges and universities cannot (or do not choose to) increase charges well above inflation in the next few years, what are the results likely to be? One way to get at an answer is to see what we have done in the last few years with the "surplus" money – the increment represented by the difference between charges and inflation. Presumably these are the things we will not be able to do in the future, at least to the same extent.

The balance of this paper presents a case study of one institution, Tufts University, in the period from 1980 through 1987. The case study is intended as a challenge. What has happened at Tufts surely differs substantially from what has happened at other institutions in the same period. The point of the exercise is the importance of looking at an institution as a whole, and of finding a method for macroanalysis. For public institutions, the importance of the historical macroanalysis remains valid, but the method would have to be adapted. We found the exercise useful in focussing on what has happened at Tufts, and illuminating with respect to what might happen in the future. We hope others may wish to attempt the same sort of analysis. (Public institutions, for instance, might worry about changing levels of state appropriations.)

# CHANGES AT TUFTS, 1981 - 1987

The analysis focusses on changes over time in current funds revenue and expenditure patterns, in the number and mix of employees by category, and in fund balances. There is a heavy dose of financial material here, not the sort of thing one sees in most institutional research papers. For this purpose, we should regard the dollars, like personnel counts, as a way of keeping score. Old-time detectives said "Cherchez la femme!" Our equivalent has to be "Suivez les francs!"

During this period, Tufts expanded rapidly, bringing on stream a School of Veterinary Medicine, a School of Nutrition, a Human Nutrition Research Center, and a Center for Environmental Management, as well as substantially increasing its sponsored research activity. The University also conducted a major fund-raising campaign and added a number of large new buildings.

Current fund revenues, expenditures and other changes.

Table 1 displays activity in the current funds from 1980-81 through 1986-87. The unconventional presentation is designed to help bring out several conclusions:

- Tufts' tuition revenues increased 78%, far faster than would have been explained by inflation, or cost factors, or increased enrollment, or even the combination of enrollment and cost factors.
    - o FTE enrollment increased only 4.5%
    - o The Consumer Price Index climbed only 28.4%, and the Higher Education Price Index only 43.1%
- We increased financial aid at the same rate we increased tuitions, so that net tuition rose as fast as gross tuition.
- All educational and general revenue sources increased faster than inflation except unrestricted private gifts. Private gifts failed to keep pace, despite a vigorous fund-raising campaign in progress during the period.

Table 1: CURRENT FUNDS REVENUES, EXPENDITURES, AND OTHER CHANGES
TUFTS UNIVERSITY (Thousands of dollars)

| Item | 1987 | 1986 | 1985 | 1984 | 1983 | 1982 | 1981 | Change '81-'87 Am't | Pct. |
|---|---|---|---|---|---|---|---|---|---|
| Indicators: | | | | | | | | | |
| FTE enrollment | 7160 | 7271 | 7638 | 7187 | 7116 | 6867 | 6853 | 307 | 4.5% |
| Consumer Price Index | 280.0 | 273.9 | 266.2 | 256.2 | 247.1 | 236.9 | 218.0 | 62.0 | 28.4% |
| Higher Educ. Price Index | 377.6 | 362.5 | 347.3 | 325.4 | 308.8 | 290.4 | 263.9 | 113.7 | 43.1% |
| Educational: | | | | | | | | | |
| Tuition and fees | 83732 | 77653 | 72743 | 66495 | 60947 | 53165 | 46970 | 36762 | 78.3% |
| Scholarships and fellowships | 16317 | 14640 | 13499 | 10816 | 9978 | 9378 | 9110 | 7207 | 79.1% |
| Net tuition | 67415 | 63013 | 59244 | 55679 | 50969 | 43787 | 37860 | 29555 | 78.1% |
| Endowment income | 4542 | 4338 | 4110 | 3479 | 3507 | 3142 | 2030 | 2512 | 123.7% |
| Priv. gifts, grants, ctr, unrestr | 5101 | 4604 | 3938 | 3986 | 3777 | 5075 | 3932 | 1169 | 29.7% |
| Gov't grants & contracts, unrestr. | 12530 | 11752 | 11194 | 8545 | 6581 | 5809 | 4096 | 8434 | 205.9% |
| Other sources | 8980 | 7383 | 5819 | 7167 | 2832 | 2336 | 2969 | 6011 | 202.5% |
| Net revenue | 98568 | 91090 | 84305 | 78856 | 67666 | 60149 | 50887 | 47681 | 93.7% |
| Instruction & academic support | 57918 | 52915 | 49241 | 44057 | 39906 | 35484 | 31571 | 26347 | 83.5% |
| Student services | 5625 | 5042 | 4340 | 3931 | 3489 | 3395 | 2941 | 2684 | 91.3% |
| Principal & interest, E&G | 3143 | 2706 | 2645 | 2297 | 1134 | 919 | 1604 | 1539 | 95.9% |
| Inst. support, plant O&M | 26975 | 25196 | 22741 | 20274 | 18804 | 19319 | 16908 | 10067 | 59.5% |
| Net | 4907 | 5231 | 5338 | 8297 | 4333 | 1032 | -2137 | 7044 | -329.6% |
| Sponsored activities: | | | | | | | | | |
| Gov't grants & contracts, restr. | 25263 | 24988 | 20910 | 16855 | 13590 | 18520 | 15969 | 9294 | 58.2% |
| Priv. gifts, grants, ctr., restr. | 8285 | 6779 | 5192 | 4925 | 4735 | 4127 | 4721 | 3564 | 75.5% |
| Independent operations revenues | 8846 | 8563 | 7847 | 8182 | 4131 | 0 | 0 | 8846 | ERR |
| Independent oper. expenditures | 8846 | 8563 | 7847 | 8182 | 4131 | 0 | 0 | 8846 | ERR |
| Sponsored research | 23236 | 22634 | 17646 | 14906 | 11264 | 13976 | 10779 | 12457 | 115.6% |
| Other sponsored programs | 5753 | 4330 | 3711 | 3932 | 3683 | 3305 | 3345 | 2408 | 72.0% |
| Public services | 451 | 391 | 501 | 577 | 500 | 397 | 460 | -9 | -2.0% |
| Net | 4108 | 4412 | 4244 | 2365 | 2878 | 4969 | 6106 | -1998 | -32.7% |
| Auxiliary Enterprises: | | | | | | | | | |
| Revenues | 20190 | 18761 | 17012 | 15520 | 14507 | 12069 | 10016 | 10174 | 101.6% |
| Expenditures & mandatory trfs. | 19574 | 18373 | 16060 | 14199 | 12714 | 9683 | 8756 | 10818 | 123.5% |
| Net | 616 | 388 | 952 | 1321 | 1793 | 2386 | 1260 | -644 | -51.1% |
| Sales & Service of Educational Activities: | | | | | | | | | |
| Revenues | 16664 | 13415 | 12268 | 10892 | 10684 | 8235 | 7542 | 9122 | 120.9% |
| Expenditures | 18369 | 15745 | 14502 | 12135 | 11005 | 8700 | 7936 | 10433 | 131.5% |
| Net | -1705 | -2330 | -2234 | -1243 | -321 | -465 | -394 | -1311 | 332.7% |
| NET BEFORE NON-MANDATORY TRANSFERS | 7926 | 7701 | 8300 | 10740 | 8683 | 7922 | 4835 | 3091 | 63.9% |

- We enriched the educational programs slightly faster than we increased student charges (78%). A good deal of this increase had to do with the new programs brought on stream during the period.

    - o instruction and academic support rose 83%. This rise took place despite increasing allocations of costs to clinics and auxiliaries.

    - o student services rose at 91%.

- The costs of institutional support (general administration) and of plant operation and maintenance rose at a rate of 59% over the period. That was considerably above the increase in consumer and higher education price indices, but a good deal less rapid than educational program costs. This rate was gratifyingly low; we had expected to see a higher increase, due to the addition of several major new buildings and staff buildup connected with new programs.

- Because of increased net revenues in the educational area, we could afford two serious deteriorations in the "profitability" of major activities. The deterioration remains, even though corrective steps were taken in 1986-87.

    - o Auxiliary enterprises (dormitories, dining halls, etc.) experienced a severe drop in profit margin. This resulted from a variety of causes: holding back on room and board charge increases; allocating more costs away from the educational and general budget and onto the auxiliaries; and increasing student meal plan flexibility.

    - o Educational activities (dental, veterinary, and medical clinics, etc.) also experienced a serious increase in net deficit. This came from the opening of Veterinary School clinics, from erosion of margin in the Dental School clinics, and from increased allocations from instructional budgets.

    - o The apparent decline in the net from sponsored programs results from an inability to separate sponsored student aid, and should be ignored.

Changes in personnel staffing

Table 2 gives the six-year changes in staffing patterns. Unfortunately, a change in the way part-time faculty were reported makes that figure non-comparable. Several conclusions can be derived:

Table 2: UNIVERSITY PAID PERSONNEL
TUFTS UNIVERSITY

| Category | Oct 86 | Jan 81 | CHANGES '81-'86 Am't | Pct. |
|---|---|---|---|---|
| By employment description: | | | | |
| Faculty - full-time | 556 | 476 | 80 | 16.8% |
| Faculty - part-time * | 239 | 350 | -112 | -31.9% |
| Exempt staff | 920 | 603 | 317 | 52.6% |
| Non-exempt staff | 1315 | 1005 | 310 | 30.8% |
| Total | 3029 | 2434 | 595 | 24.4% |
| By EEOC job category: | | | | |
| Officials and managers | 280 | 239 | 41 | 17.2% |
| Instructional staff - full-time | 556 | 476 | 80 | 16.8% |
| Instructional staff - part-time * | 239 | 350 | -112 | -31.9% |
| Professional staff | 624 | 368 | 256 | 69.7% |
| Technical staff | 253 | 149 | 104 | 70.0% |
| Clerical staff | 669 | 524 | 145 | 27.6% |
| Crafts and trades staff | 51 | 47 | 4 | 8.5% |
| Service workers | 359 | 282 | 77 | 27.3% |
| Total | 3029 | 2434 | 595 | 24.4% |
| Organization: | | | | |
| Liberal Arts | 474 | 436 | 38 | 8.7% |
| Engineering | 78 | 75 | 3 | 4.0% |
| Special Studies | 0 | 39 | -39 | -100.0% |
| Other Arts and Sciences | 236 | 136 | 100 | 73.2% |
| Subtotal A&S | 787 | 685 | 102 | 14.8% |
| Fletcher | 77 | 68 | 9 | 13.2% |
| Nutrition (+ Nutr. Rsch. Ctr) | 188 | 6 | 182 | 3025.0% |
| Medical | 414 | 534 | -120 | -22.5% |
| Dental | 276 | 274 | 2 | 0.7% |
| Veterinary | 209 | 52 | 157 | 304.9% |
| Med, Dent, Vet - joint appts. | 103 | 46 | 57 | 123.9% |
| Provost's office, acad, supt. | 84 | 113 | -30 | -26.1% |
| President's office | 19 | 24 | -5 | -21.3% |
| Development | 149 | 91 | 58 | 63.2% |
| VP Admin | 39 | 32 | 7 | 20.3% |
| Plant and services | 538 | 413 | 125 | 30.1% |
| Finance | 145 | 97 | 48 | 49.7% |
| Planning | 6 | 1 | 5 | 500.0% |
| Total | 3029 | 2434 | 595 | 24.4% |

* Part-time faculty were evidently counted differently in 1986 than they were in 1981.
Part-time personnel counted as 1/2 throughout, for consistency.

- Full-time faculty strength rose 16.8%, above the 4.5% increase of FTE students. It is not possible here to distinguish how much of this faculty increase is related to the growth of sponsored research expenditures (116%) vs. the enrollment increase, but it is probably safe to assume that the student/faculty ratio did not change materially.

- The major increases in personnel came in professional and technical staff, at 70% each. These resulted from increased sponsored research activity, notably at the two federally-funded research centers.

- The number of officials and managers rose 17%, about the same rate as full-time faculty but below the rate of growth of all personnel. As noted above, the modest size of this increase was welcome; we had expected to find that a substantial share of the incremental real revenue had gone to bureaucratic expansion.

Changes in fund balances

Table 3 summarizes data on changes in fund balances between 1981-82 and 1986-87.

- Tufts added almost $180,000,000 to its fund balances in these six years, almost doubling the 1981-82 year-end total fund balance of $199,452,000. The components of this increase were as follows:

    - o $73,877,000 from current operations (before transfers), by far the largest single component
    - o $59,269,000 from investment activities, mainly in the increase in value of endowment assets, but also including interest on other funds;
    - o $53,380,000 in private gifts, mainly in additions to endowment and physical plant;
    - o $19,769,000 in federal construction grants; and
    - o $27,340,000 in costs, mainly for debt service and for repayment of capital campaign startup costs.

- The net from current operations before transfers was about 7.5%, a substantial margin. (Note that a substantial portion of that margin was for mandatory principal and interest payments; it was not all discretionary.)

Table 3: CHANGES IN FUND BALANCES
TUFTS UNIVERSITY (Thousands of dollars)

| | 1987 | 1986 | 1985 | 1984 | 1983 | 1982 | SUM '82-'87 |
|---|---|---|---|---|---|---|---|
| Current funds: | | | | | | | |
| Revenues | 207227 | 192510 | 172849 | 155044 | 130684 | 119221 | 977535 |
| Expenditures | 194314 | 178330 | 160067 | 140276 | 120349 | 110322 | 903658 |
| Subtotal | 12913 | 14180 | 12782 | 14768 | 10335 | 8899 | 73877 |
| Mandatory Transfer to Plant | 4423 | 3956 | 3856 | 3413 | 2089 | 1640 | 19377 |
| Trf to loan funds, other | -181 | 100 | 302 | 525 | 230 | 152 | 1128 |
| Trf to endowment funds | 1369 | 1329 | 1300 | 1157 | 1099 | 968 | 7222 |
| Trf to plant funds | 7103 | 6276 | 10126 | 8588 | 6986 | 4741 | 43820 |
| Net change, current funds | 199 | 2519 | -2802 | 1085 | -69 | 1398 | 2330 |
| Loan funds: | | | | | | | |
| Government grants | 400 | 168 | 281 | 201 | 288 | 478 | 1816 |
| Private gifts | 443 | 505 | 825 | 119 | 223 | 70 | 2185 |
| Investment gains & interest | 769 | 712 | 538 | 427 | 409 | 469 | 3324 |
| Net transfers in | 52 | 164 | 292 | 545 | 351 | 193 | 1597 |
| Costs, writeoffs, etc. | 163 | 131 | 177 | 187 | 209 | 173 | 1040 |
| Net change, loan funds | 1501 | 1418 | 1759 | 1105 | 1062 | 1037 | 7882 |
| Endowment funds: | | | | | | | |
| Private gifts | 4176 | 2792 | 5209 | 1927 | 2313 | 1615 | 18032 |
| Investment gains, losses, income | 8833 | 15511 | 13002 | -7338 | 14952 | -4951 | 40009 |
| Net transfers in | 1105 | 1717 | 1267 | 1157 | 964 | 2326 | 8536 |
| Costs | 551 | 463 | 418 | 337 | | | 1769 |
| Net change, endowment funds | 13563 | 19557 | 19060 | -4591 | 18229 | -1010 | 64808 |
| Plant funds: | | | | | | | |
| Government grants | 806 | 2226 | 8128 | 2032 | 676 | 4080 | 17948 |
| Private gifts | 7202 | 5605 | 5530 | 5137 | 4956 | 4733 | 33163 |
| Investment gains, losses, income | 3414 | 3348 | 4291 | 2086 | 1709 | 1088 | 15936 |
| Net transfers in | 11557 | 9784 | 14024 | 11980 | 9090 | 4982 | 61417 |
| Debt interest paid | 3681 | 3135 | 3235 | 3117 | 1860 | 1487 | 16515 |
| Renewal & repl., debt retirement | 1064 | 456 | 891 | 1569 | 1955 | 2081 | 8016 |
| Net change, plant funds | 18234 | 17372 | 27847 | 16549 | 12616 | 11315 | 103933 |
| TOTAL ALL FUNDS | 33497 | 40866 | 45864 | 14148 | 31838 | 12740 | 178953 |

- Endowment funds rose $64,800,000, of which $40,009,000 came through investment gains, helped by the rising stock market.

- The largest increase in fund balances was in the plant funds section, up a total of $103,900,000. In Tufts' case, as for many institutions, the plant funds section contains major reserves as well as physical facilities funds. Private gifts and government grants for construction brought in $51,000,000 during this period, and a total of $54,000,000 was spent on new facilities. The balance of the increase, funded mainly by transfers from current funds and by investment gains, went to build up the University's financial reserves. (Note that those reserves reduce the institution's cost of borrowing, reduce the need to borrow, provide flexibility in program and construction decisions, and protect against future contingencies.)

Some overall conclusions:

The point of this exercise was to see what we did with the incremental revenues – and to identify those changes that we might not be able to continue to make if our ability to increase student charges above the level of inflation declines. Several conclusions emerge:

1) We have enriched the educational program far faster than inflation, principally through startup of new programs; we might not be able to continue to do so. **That program enrichment, moreover, did not provide any improvement in student/faculty ratio.** If we need in the future to cut back without affecting that ratio, the cuts will have to be very sharp in support areas and in salaries.

2) We have been able to enroll good students without increasing student aid any faster than student charges. We will probably be all right in the future **with an increase in aid at the same rate as tuition, unless the applicant pool or yield rate drops off significantly, which either may well do.**

3) We have afforded deteriorating profit margins in auxiliaries and clinic operations, partly through opening new clinics, offering new dining plans, and shifting costs out of instructional areas. **These deteriorating trends were reversed in 1987.**

4) Most dramatically, we have spun off a lot of money from current operations to build reserves, pay for a capital campaign, and construct and update physical plant. **In the future, our ability to strengthen reserves and improve plant may be much more severely limited to the funds we bring in from the outside.**

5) In sum, there is a clear implicit message: if our hypothesis about limited future ability to raise tuition rates is correct, **we will be much more limited than we have been in our ability to take on new ventures and new facilities, unless their incremental costs are fully covered by incremental revenues, from sponsored programs, gifts, or endowment revenues.**

## SUMMARY

The patterns that emerge in the Tufts case study show an institution that strengthened itself markedly during this period. The implications for the future are clear, however: if tuition increases are constrained, continued development is going to have to be financed in quite different ways. What would such an analysis show at your institution?

# A SECTOR-WIDE COMMUNITY COLLEGE STUDY TO ASSESS GENERAL EDUCATION OUTCOMES

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The purpose of this paper will be to describe a study that was conducted at thirteen New Jersey Community Colleges during the spring and subsequent fall semesters of 1986. Although it was anticipated that a complete data analysis would have been completed by the date of this presentation, this was not possible due to some unavoidable problems. It is expected that this analysis will be completed within the next two weeks. Nevertheless, it is possible to discuss some of the preliminary findings and to provide some guidelines to those who would be interested in exploring the world of general education outcomes assessment.

In the fall of 1984, the then president of Brookdale Community College, Dr. B. A. Barringer, requested the author to begin exploring the possibility of sophomore assessment at the College. He was concerned that the New Jersey Department of Higher Education would embark on such a project and thus wanted to explore the various options prior to that event. He also had noted with interest the events in Florida and was concerned that this model might be transferred to New Jersey. Excerpts from his memorandum follow:

> "Most of us who work at Brookdale believe that the College is a quality institution committed to providing an environment of excellence which is the key to the success of our student. It is always our concern that intellectual growth has occurred as a result of our efforts with students while they are at Brookdale....With this in mind, it may be an appropriate time for the College community to open a discussion of the ways in which we can document the academic progress of our students....The recent national emphasis on quality in education will place increased pressure on all colleges to document their successes. I believe it would be helpful for us at this time to open a discussion on the employment of a comprehensive examination which would be another device for measuring progress within certain key areas of knowledge and skill development....I am not advocating an examination as a requirement for graduation, only suggesting that we discuss the employment of an examination which might be administered to a random sample of students to discern whether or not they have made progress....It might be administered in the Testing Center, using the basic skills test as well as other tests developed by faculty. It would most definitely include a writing component. The reason I suggest the use of the basic skills test is that it establishes a common benchmark upon entry for each student and thus better enables us to see the magnitude of progress made....These are ideas that I am asking that we consider, and I am committed to nothing at this point except to opening the dialogue on campus. I believe that we may face, sooner than expected, an intense pressure to test at a statewide level, and I would like to have had an opportunity in advance to think through implications for such a venture."

Surprisingly, when the author contacted the Department of Higher Education, he was informed that the Department was far too busy with its basic skills testing program and thus would not be able to add any new initiatives for at least two or three years. When these discussions were shared with Dr. Barringer, he continued to request that a task force be established to study the issue and to provide him with a written report and recommendations.

This author then proceeded to assemble a small task force consisting of three administrators and four faculty members. Since the president had requested a report within a relatively short period of time, it was decided that a small, but credible, committee could meet this charge.

The Task Force first met in February of 1985. As its first agenda item, it debated the merits of sophomore assessment and whether or not a positive proposal of any type should be submitted to the president. Of particular concern was the notion of a gateway measure that would determine whether students could advance to the junior year. To a person, the members rejected this notion on a number of grounds. In the first place, they believed that no measure or set of measures were sufficiently precise to accurately and completely assess the outcomes of a community college education. Secondly, the result would inevitably be the test determining the curriculum rather than the other way around. Lastly, teaching would center on helping students pass a test rather than on learning the various subject matters and also becoming generally educated. This would serve to trivialize rather than enhance the educational process.

Although the Task Force was firmly committed to not recommending any gateway testing process, it did agree with the president that the time had arrived for the development of an outcomes assessment approach. Some of the alternatives explored included The College Boards's College Level Examination Program (CLEP), Florida's College Level Academic Skills

Test (CLAST), materials from the National Center for Higher Education Management Systems (NCHEMS), the development of homegrown instruments, and The American College Testing Program's College Outcomes Measures Program (COMP). After extensive discussion, it was decided that the COMP provided the best avenue for outcomes assessment at Brookdale.

There were a number of overriding reasons for this selection. Primary among them was the fact that the COMP was not directly curriculum based. One could not examine item responses and then point a finger at a specific course and say that the problem was due to the fact that this topic was not covered therein. Nevertheless, the evidence gathered on the COMP does indicate that it measures abilities relevant to effective functioning in adult roles. Scores obtained on the six measured areas did correlate strongly with such indicators as job supervisor ratings, social-economic statuses of job function, the degree of participation in community volunteer activities and the amount of continuing education after the undergraduate program. The COMP stands in marked contrast to most achievement tests used at the college level in that most of these tests measure the acquisition of specific facts, concepts, and principles. Although such acquisition is important, it cannot be said that this represents the most important outcomes of a higher education. At least equally important is the ability to apply specific facts, concepts, and principles in work, family, and community roles.

It is also of interest to note that research clearly

links what is measured by the COMP to what is taught in general education courses. Students who take more of such course work tend to show higher score gains than those who take less. Since Brookdale along with all the other community colleges in New Jersey had recently revised its general education policies, the fact that the COMP purported to measure general education outcomes made this measure particularly appealing.

Another major reason for selecting the COMP was related to its value added approach. If we are to be truly aware of what each student learns in college, we must know what knowledge that student comes to us with. The assumption that the Harvards and Stamfords are the best institutions is rooted basically in their products rather than on the learning that actually takes place. One cannot easily ascertain whether students learn more at these institutions than at others that are less well known. However, the value added approach can present an approximation of this learning through the utilization of the same instrumentation in a pre- and post-test manner. Also, such an approach can serve to provide at least some answers to the question of whether college makes a difference.

The Task Force made its final recommendations to President Barringer in June of 1985. Briefly, it urged that the College embark upon a pilot project that would entail administering the COMP to a representative sample of entering freshmen and graduating sophomores. Students would be matched on

such variables as entering basic skills test scores, sex, degree type, race, and age. The underlying assumption would be that students who had greater exposure to general education would achieve greater score gains. It was frankly expected by most committee members that the president would reject this recommendation due to the belief that such a project would run counter to the expressed intentions of the Board of Higher Education. By that time, the Board had already apparently committed itself to the development of instrumentation that would seek to determine whether New Jersey graduating sophomores had achieved sufficient higher order basic skills. Nevertheless, the president not only accepted the recommendation but he also contacted other community college presidents to ask if they would like to participate in this pilot program along with Brookdale. When the Department of Higher Education learned of this, they indicated a willingness to consider funding such a project. In August, the director of the COMP Program, Aubrey Forrest, met with interested representatives of the various community colleges and the Department of Higher Education. At that time, a statewide task force on sophomore assessment was established with the author as the chairperson.

After much deliberation, thirteen of the nineteen New Jersey community colleges agreed to participate in the study. A number of funding proposals were developed which eventually led to an agreement in March of 1986 by the Department of Higher Education to fund the project. The

study then commenced in April of that year.

The purposes of the study were as follows:

1. To conduct a pilot testing program in order to assess the appropriateness and effectiveness of the College Outcomes Measures Program in assessing the general education knowledge and skills of New Jersey community college freshmen and sophomores.
2. To obtain a profile of a sample of community college freshmen and sophomores regarding their general education competencies.
3. To gain experience with the problems and issues involved in sophomore assessment.
4. To evaluate the COMP's usefulness in measuring "value added" in higher education.

In order to help in both the selection of the the study sample and the analysis of the data, each participating college were to choose students for the sample from the following curriculum clusters: all Associate of Arts programs, all Associate of Science programs, Associate of Applied Science programs in allied health, science, and engineering technologies, and Associate of Applied Science programs in business and commerce. Since according to Department of Higher Education guidelines, each of the major degree programs was to require a different number of general education credits, this seemed to provide an appropriate vehicle for evaluating the effectiveness of the COMP. The applicable credit range was

from 45 for the Associate of Arts programs to 20 for the Associate of Applied Science programs.

The samples of sophomore students to be tested were to be identified by randomly selecting a percentage of eligible graduating sophomores in each cluster so as to result in a sample of approximately 50 percent of eligible sophomores not to exceed 300. The reason for this upper limit resulted from the fact that the sizes of New Jersey community colleges varied from less than 1,000 to more than 11,000. If only simple percentages were utilized in order to gain statistical purity, the smaller colleges would not achieve a sufficient sample size to be able to conduct any local analyses. Only those students who had applied for graduation were to be included. Students who had transferred in more than twelve credits or who were candidates for certificates were to be excluded from the study.

The sample of freshmen entering in the Fall of 1986 were to be selected by matching them with the selected sophomores on sex, ethnicity, age, curriculum, and basic skills test scores. The tested sample was to be as much as twice the size of the sophomore sample so that matching by computer would be possible.

The data to be collected for each member of the study sample included name, Social Security number, freshman/sophomore code, sex, ethnicity, date of birth, semester of entry, number of semesters attended, degree program, curriculum cluster, credits attempted through the fall of

1985, cumulative grade point average during the same time period, basic skills test scores, and COMP scores. Aside from the reports available from the American College Testing Program, the analysis of the data was to include the following:

1. COMP scores (total and component) for freshmen (pre-test scores) and sophomores (post-test scores) and the score differences (gain scores) were to be reported for each participating college (without identifying the college) for the total study sample and for each of the following subgroups:
   - Male/female
   - Ethnic groups
   - Age groups
   - Curriculum clusters
   - Initial basic skills levels in reading, English, computation, and elementary algebra.
2. Correlations between age, basic skills scores, grade point average, and the number of semesters attended on the one hand and COMP scores (total and component) of freshmen, sophomores, and difference scores on the other hand.
3. After controlling for any of the background variables which were found to be significantly related to COMP scores, the relationships between the curriculum clusters on the one hand and COMP scores for freshmen and sophomores, and difference scores on the other

hand were to be analyzed and reported.

Prior to commencing with this project, Brookdale decided on its own to test a sample of freshmen and sophomores during the fall semester of 1985. A total of 1200 students divided evenly between freshmen and sophomores was invited to take the COMP. Each invitee was told that they were doing something very important that would contribute to the future direction of the college. Furthermore, each was offered a $5.00 credit at the bookstore. A sufficient number of testing sessions was offered during the mornings, afternoons, evenings, and Saturdays to accommodate any and all students. Yet, the reality was that only 100 students appeared for the testing.

On the basis of these results, Brookdale recommended to the statewide task force that the COMP testing be made mandatory. After extensive discussion, this recommendation was rejected although some colleges indicated that they would attempt to comply. That spring, only 990 sophomores were tested instead of the anticipated sample of 3,000. The only respectable sample sizes were from those institutions that did require the testing.

On the basis of these results and some political considerations, four colleges dropped out of the study prior to the testing of freshmen students the subsequent fall. However, the total sample size increased to over 1400 students. It was obvious that for a true sophomore assessment to occur, it would be necessary for the colleges to develop mechanisms to

make such a process mandatory.

As indicated previously, the data analysis has not yet been completed. Nevertheless, it is possible at this time to reveal certain conclusions. In the first place, significant gains were found on all subtests with the exception of Clarifying Values and Communicating. It was not unexpected that such might be the case with the former since the content is not necessarily covered in most curricula. The subtest is designed to deal with a student's ability to identify his/her personal values and the personal values of others, understand how personal values develop, and analyze the implications of decisions made on the basis of personally held values. However, the lack of significant change in the Communicating subtest is quite surprising. Tentative results show that in some instances, there is a decline in scores from freshmen to sophomores. Also, men tended to score higher than women as did students in the math, science, and engineering curricula when compared to those in the social sciences and humanities. In all cases, although these students scored higher both as freshmen and as sophomores, the gain scores were not significant. It would seem that this subtest should be reviewed by ACT to determine if it is performing as intended.

Another very interesting finding relates to the fact students who score in the very low ranges on the Reading Comprehension basic skills test make greater gains on the COMP than do students who are in the middle or high ranges even though all the gains are significant. On the other

hand, scores on the writing basic skills test show the greatest gains for students at either the low or middle ranges. This seems to indicate that the decision as to whether one possesses the appropriate skills in this area is much more dichotomous that in the case of reading.

Somewhat provocative is the finding that students in the Associate of Applied Sciences programs seem to have made greater gains on the COMP than did students in the Associate of Arts or Associate of Science programs. Since the assumption was that the opposite would be the case, this was quite surprising. However, when one looks at the COMP, it is evident that what is being tapped is the ability of students to apply that which they already know. Very little emphasis is given to theory. Yet, for the most part, general education programs in New Jersey community colleges consist of courses that are primary parts of specific programs. Therefore, the content may tend to be more theoretical and less applied. Conversely, the content of applied sciences tends to be highly applied. Therefore, one possibility that needs to be explored is the development of interdisciplinary general education courses that emphasize both knowledge and application. Of course, another possibility is that the COMP is not an adequate measure of growth in general education competencies. Previous research appears to show that this is not the case.

# THE EFFECTS OF CORE CURRICULUM ON THE DEVELOPMENT OF GENERAL EDUCATION SKILLS: LIBERAL ARTS CLAIMS TESTED

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## INTRODUCTION

In the "Forward" to Allan Bloom's The closing of the American mind, Saul Bellow preempts his critics and offers his own view of the central theme of his 1964 novel, Herzog.

> I meant the novel to show how little strength 'higher education' had to offer a troubled man. In the end, he is aware that he has had no education in the conduct of life (at the university who was there to teach him how to deal with his erotic needs, with women, with family matters?) and he returns, in the language of games to square one... (Bloom, 1987, p. 16).

Bellow's remarks about the fictional Herzog are but a preliminary to the rest of Bloom's book which, despite Bloom's protestations to the contrary, is a jerimiad on the state of American higher education (Bloom, 1987, p. 22). In particular, Bloom laments what American liberal education fails to provide -- "... a space between the intellectual wasteland [the student] has left behind and the inevitable dreary professional training that awaits [him or her] after the baccaleaurate" (Bloom, 1987, p. 336). For salvation, Bloom exhorts his readers to a vision of liberal education where students must "...learn there is a great world beyond the little one [they] know, experience the exhiliration of it and digest enough of it to sustain [them] in the intellectual deserts [they are] destined to traverse" (Bloom, 1987, p. 336).

Critiques of American higher education, especially liberal education, are by now familiar enough. The curriculum has become too specialized, too professionalized critics contend, depriving students of the kinds of courses which provide education (not training) that will last a lifetime. Recently, for example, Ernest L. Boyer's College: The undergraduate experience in America calls upon colleges to teach knowledge which endures by creating an integrated core, "...a program of study that introduces a student to essential knowledge, to connections across the disciplines, and, in the end, to the application of knowledge beyond the campus" (Boyer, 1987, p. 91). Three years prior to Boyer's work, the National Institute of Education (NIE) Study Group issued Involvement in learning, a program of educational reform which declares that "all bachelor's degree recipients should have at least two full years of liberal education" (NIE, 1987, p. 41), and insists that such a requirement "...would enable students to adapt to a changing world, providing them with abilities... to think critically, to synthesize large quantities of new information, and to master the language skills... that are the fuel of thought" (NIE, 1987, p. 43).

What are we to make of such claims about the efficacy of liberal education? They are so familiar and so historically rooted that questioning their validity seems tantamount to heresy. Yet, if we are truly committed to the reformation and improvement of higher education, if we are sincerely interested in graduating students whose minds have been cultivated and not merely trained, then it is legitimate to wonder if a return to the liberal arts will bring with it the kind of higher order learning and possibilities for human development that its proponents contend.

## STUDY PURPOSES AND PROCEDURES

This study was undertaken at Neumann College as part of a larger curriculum evaluation project, funded by a grant from the Exxon Education Foundation. Neumann is a small, private, four year Catholic college which combines a liberal arts education with professional training. A core curriculum, comprising up to 40 credits, is constituted by traditional liberal arts courses (e.g., philosophy, English, mathematics,etc.). Students complete most of their core requirements in the first two years of study, leaving the last two years to concentrate in one of the college's eleven majors. For purposes of this study, these eleven majors were broken down into two broader groups, Liberal Arts (LA) and Professional (PROF). These two groups differ in their curricular emphasis and vocational orientation. The LA group, which places heavy emphasis on arts and sciences subject matter, includes majors in arts and letters, behavioral science, biology, communications, English, political science and religious studies. Comprising the PROF group are majors in business administration, education, medical technology and nursing. This research effort was guided by three expectations: first, there would be progressive development of general education skills over four years of college; second, this development would be attributed in part to the effects of core curriculum and in part to the effects of majors, particularly those deemed congruent with core (i.e, with heavy emphasis in the arts and sciences); and third, majors (i.e., LA Group) congruent with core would outperform significantly vocationally-oriented majors (i.e., PROF Group) on a test of general education knowledge and skills.

The ACT COMP Objective Test (Form IX) was selected as the measure to assess general education outcomes. The test contains six scales,

three which measure content outcomes (Functioning within Social Institutions; Using Science and Technology, and Using the Arts) and three which measure process outcomes (Communicating, Solving Problems, and Clarifying Values).

In March, 1987 this test was administered by college faculty and staff to a self-selected sample of 152 students from a population of 495 traditional-aged freshmen, sophomores, juniors, and seniors. In addition to the test, records from the college's admission's and registrar's offices were used to obtain measures of ability (College Board SAT), college achievement (cumulative GPA), students' majors and numbers of credits earned.

The voluntary nature of the study was a very important factor in determining the characteristics of the study sample. Test takers had significantly higher average SAT scores and cumulative GPAs when compared with no-shows (i.e., students who confirmed they would take the test but didn't) and refusals (i.e., students who initially indicated they were not interested in being tested).

## RESULTS

Table 1 reports the results of univariate and multivariate analysis of variance for Lower Division (LD, freshmen and sophomores) and Upper Division (UD, juniors and seniors) on the ACT COMP total score and sub-scores.

Table 1

ACT COMP Average Total Score and Sub-Scores for Lower and Upper Division Students

| SCALE | LOWER DIV. (N=86) | UPPER DIV. (N=66) | UNIVARIATE F-RATIO |
|---|---|---|---|
| Total | | | |
| Mean | 180.8 | 187.2 | 8.33** |
| Stand. Dev. | 14.9 | 11.4 | |
| FSI | | | |
| Mean | 59.7 | 62.8 | 9.91** |
| Stand. Dev. | 6.7 | 4.8 | |
| US | | | |
| Mean | 61.5 | 63.9 | 5.38* |
| Stand. Dev. | 6.9 | 5.6 | |
| UA | | | |
| Mean | 59.3 | 60.5 | 2.30 |
| Stand. Dev. | 4.8 | 5.1 | |
| COM | | | |
| Mean | 50.0 | 52.5 | 5.22* |
| Stand. Dev. | 6.8 | 6.0 | |
| SP | | | |
| Mean | 73.3 | 76.6 | 12.19** |
| Stand. Dev. | 6.3 | 5.3 | |
| CV | | | |
| Mean | 57.3 | 58.3 | 1.22 |
| Stand. Dev. | 5.6 | 4.7 | |
| MANOVA F(6,145)=3.03** | | | |

* $p < .05$
** $p < .01$

The results indicate growth in general education skills from the LD to the UD on the ACT COMP total score and all six sub-scales. Statistically significant differences between the divisions were found on total score and FSI, US, COM and SP sub-scales. Although not reported in Table 1, inspection of the mean scores for freshmen, sophomores, juniors and seniors shows consistent increases from the

freshmen to the senior year on the total score and on three of the six sub-scales, COM, SP and CV. Based on juniors and seniors in our sample for whom SAT scores were available, the average total score that group would have made on this test as freshmen can be accurately estimated. According to a report of our test results prepared by ACT, the average gain in total score on the COMP test was "well above the mean for senior gains" (Steele, 1987, p. 5) compared with a group of 117 senior institutions. The division level gains shown in Table 1 are not only significant by themselves but also appear to compare favorably with normative gains.

Before examining the effects of core curriculum and academic majors on the development of general education skills, it is useful to compare the distribution of credits taken in core and in majors for both LD and UD students and for the LA and PROF majors, as shown in Table 2 below. The assumption made here is that the more credits a student has, the greater the impact a college education is likely to have.

Table 2

Total, Core, and Major Credits for Lower and Upper Division Students by Major Group

| DIVISION | MAJOR GROUP | SAMPLE SIZE | AVERAGE TOTAL CREDITS | AVERAGE CORE CREDITS | AVERAGE MAJOR CREDITS |
|---|---|---|---|---|---|
| Lower | Total | 85 | 38.1 | 24.0 | 6.0 |
| | LA | 19 | 35.6 | 23.5 | 9.0 |
| | PROF | 66 | 38.8 | 24.1 | 5.1 |
| Upper | Total | 64 | 94.8 | 35.1 | 27.2 |
| | LA | 21 | 93.8 | 34.0 | 27.8 |
| | PROF | 43 | 95.3 | 35.7 | 26.9 |

Table 2 indicates several facts: first, UD students have nearly 60 more total credits on the average than LD students; LD students have completed a substantial number of core credits (27) and only a small number of credits in their majors. In contrast, UD students have a few more core credits (35), and a lot more credits in their major (27) compared with LD students. It should be noted that adding the number of core credits and credits in the major does not give the total number of credits in the table. The difference between the total and the sum of core and major credits is explained by credits taken in allied and elective courses. Table 2 reveals that the credit differential between the LA and PROF groups is very small at both the UD and LD. The differences are no greater on the average than about 3 credits or the equivalent of one course. The two groups, therefore, appear to progress at the same rate in completing their core and major credit requirements.

The next question is whether or not the significant differences between LD and UD students on the ACT COMP test can be attributed to exposure to core and majors. Table 3 reports the results of a two-way analysis of variance on the ACT COMP total score.

Table 3

ACT COMP Total Score for Lower and Upper Division Students by Number of Core Credits

| DIVISION | CORE CREDITS | SAMPLE SIZE | MEAN SCORE |
|---|---|---|---|
| Lower | | | |
| | 0-15 | 19 | 186.4 |
| | 16-30 | 47 | 179.2 |
| | 31 or more | 20 | 179.4 |
| Upper | | | |
| | 0-15 | 7 | 184.1 |
| | 16-30 | 11 | 189.3 |
| | 31 or more | 48 | 187.3 |
| Core Effect: F (2,146) = 0.92 (NS)<br>Core x Division Effect: F (2,146) = 1.45 (NS) | | | |

We found neither a significant effect of core nor an interaction effect of core with division. At each division level students with different numbers of core credits performed about equally well.

The same type of analysis as above was also performed on credits in the major. These reults are reported in Table 4:

Table 4

ACT COMP Total Score for Lower and Upper Division Students by Major Credits

| DIVISION | MAJOR CREDITS | SAMPLE SIZE | MEAN SCORE |
|---|---|---|---|
| Lower | 0-10 | 67 | 180.0 |
| | 11 or more | 19 | 184.1 |
| Upper | 0-10 | 12 | 187.1 |
| | 11 or more | 54 | 187.3 |
| Major Effect: F (1,148) = 0.89 (NS) | | | |
| Major x Division Effect: F (1,148) = 0.50 (NS) | | | |

No significant effect of major was found. The number of credits in the major appears to have no impact on the ACT COMP total score at either the UD or LD.

Finally, we compared the achievement of the LA and PROF groups on the total score for LD and UD in the same manner as above.

Table 5

ACT COMP Total Score for Lower and Upper Division Students by Category of Major

| DIVISION | MAJOR GROUP | SAMPLE SIZE | MEAN SCORE |
|---|---|---|---|
| Lower | | | |
| | LA | 19 | 183.9 |
| | PROF | 67 | 180.8 |
| Upper | | | |
| | LA | 21 | 190.8 |
| | PROF | 45 | 186.8 |
| Major Group Effect: F (1,148) = 2.41 (NS) | | | |
| Division x Major Group Effect: F (1,148) = 0.01 (NS) | | | |

Again the differences between LD and UD are not related to whether a student majored in liberal arts disciplines or majored in vocationally oriented programs.

## DISCUSSION

Total and selected subscores for the LD and UD groups (Table 1) yield results which are congruent with our beliefs about the impact of a Neumann education and which are, frankly, desired. Neumann's UD students scored significantly higher than LD students. It seems, then, that there is a "college effect" on the development of general education skills, particularly in four areas: FSI, US, COM and SP.

Our central question, though, is not to learn if there is a "college effect" on the development of general education skills, but to determine if there is a liberal arts "core effect." If the claims made for the liberal arts are valid, we should expect liberal arts and professional students to score about the same at the LD, and then show performance differences at the UD favoring those whose

majors are congruent with the liberal arts core (i.e., LA Group).

Tables 3 4, and 5 above help to answer this question, but in a way that we did not expect. Students in the LD having completed anywhere from 0-30 plus credits in core score about the same on the test; UD students likewise show no significant achievement differences based on exposure to core. The number of core credits a student has makes no difference, therefore, at either the LD or UD on the COMP total score.

Does the number of credits students have completed in the major have an impact on the COMP total score? As Table 4 shows, Neumann students score about the same on COMP regardless of the number of credits completed in the major. There appears to be no direct link between exposure to the major and the development of general education skills.

Finally, the data in Table 5 contravene our expectation that students in liberal arts majors, that is, students studying areas highly congruent with the liberal arts core would score higher than students in professional majors, that is, areas with a low degree of congruence with the content of our liberal arts core. Simply, there is no difference. In both the LD and UD, students show comparable achievement regardless of major.

How, then, do we explain the large differences between LD and UD students? The data reported here suggest that the gains in general education skills measured by COMP cannot be directly attributed to our liberal arts core nor to a particular category of major. The standard claims made about the efficacy of liberal arts general education made by Bloom and others appear not to be substantiated here. Professional preparation at a college like Neumann seems to be equally beneficial

in developing abilities normally associated with the liberal arts.

Further attempts were made to explain LD and UD differences on the COMP by comparing these groups on measures of ability and college achievement. Using the combined verbal and mathematical scores of the College Board SAT as the measure of ability and the cumulative grade point average as the measure of achievement reveals no statistically significant differences between the groups on the average scores for either factor. Not only are these groups statistically equivalent, numerical differences are extremely small (e.g., LD SAT = 933; UD SAT = 935).

But clearly there is growth in general education skills which can be reasonably attributed to the impact of our college. The specific explanation for this difference has yet to be found. Perhaps we should focus now on a broader definition of the college curriculum, one which includes more than courses. What is the role of age, experience, and motivation in the development of the skills COMP measures? If there is a role, and if we heed our critics and attempt to improve significantly the skills normally associated with the liberal arts core, what is the point of attack? In short, what is COMP really measuring and can "it" be isolated, targeted, and meliorated? A more conclusive answer to this question then we were able to determine should help not only with curriculum planning but also assist in defining boundaries for assessment which may need to include more than discrete chunks of the curriculum (i.e., basic skills, general education, majors).

The results of this study have caused us to re-think its underlying premise: that general education outcomes can be explained simply in terms of curricular categories or accumulation of credits. The

results suggest an entirely different premise, namely, that outcomes of the kind we assessed are a function of the way students experience the curriculum as opposed to the way it is organized. We think now that students may not experience the curriculum as a separate and distinct set of courses, disciplines, or levels of knowledge but rather as a more wholistic, permeable and fluid process which they pursue in ways not yet known to us. The sharp boundaries which we think exist between disciplines, between a general core curriculum and specific majors, and between a liberal arts and vocational emphasis may not in fact be very relevant to the student learning experience. The question which emerges from this study is, therefore, considerably more complex than the one we began with: it is not whether the curriculum can be separated into some meaningful categories and then be related to variation in student learning, but whether and how students "blend" diverse parts of the curriculum together in the course of developing general education skills.

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# ACADEMIC DIFFICULTY: EXAMINING ALL THE FACTORS

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A variety of factors are frequently cited when explaining why students get into academic difficulty. Most often those factors are associated with academic matters such as poor academic preparation, poor academic advising, dissatisfaction with the curriculum, or boredom with courses. In addition, there are often social, environmental, and/or emotional factors which are identified as contributing to academic difficulty. The primary purpose of this paper is to examine the factors that contributed to the academic difficulty of freshmen at Tufts University during the 1985-86 and 1986-87 academic years.

## METHOD

The research that provided the basis of this paper was conducted in two stages. At the close of the 1985-86 academic year, a study was undertaken to examine whether differences existed between those freshmen who had been placed on some form of academic probation and a matched control group.[1] Few statistical differences were identified and it was speculated that additional factors that were not readily available (including social and emotional factors), might be contributing factors to the students' academic difficulty.

In order to test the hypothesis generated from the 1985-86 study, an examination of freshmen who were placed on academic probation during the 1986-87 academic year was initiated. The 1985-86 comparison of the academic difficulty group and a matched control group was replicated. In addition, structured interviews were conducted with students in the academic difficulty group.

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[1] A sample matched by major, but twice as large as the academic difficulty group, was randomly selected from the total freshman population.

The primary sources of data were the students' academic files and structured interviews with individual members of the 1986-87 academic difficulty group.[2] Variables that were extracted from the students' files included (1) descriptive items such as gender and ethnicity; (2) pre-college academic measures, including SAT scores, class rank, and intended major at time of admission; and (3) college academic measures, including courses taken, grades earned, number of credits carried and number of credits earned. Information regarding such things as participation in extracurricular activities, employment, attitudes about college and course work, and the utilization of university resources were obtained through the personal interview.

## RESULTS

During the 1985-86 academic year, slightly more than three percent (38 students) of the freshman class[3] were considered to be in academic difficulty. The probationary status (refer to Table 1 for specific distribution) of these students ranged from receiving a warning (approximately 40%) to being required to withdraw from the university for a period of two semesters (approximately 8%).

The number of freshmen who were identified as being in academic difficulty during 1986-87 academic year was forty. This represented slightly under three percent of all first time students.[4] This was not very different from the numbers reported the previous year. The distribution of probationary status (Table 1) was slightly different than the preceding year. However one similarity was the fact that the largest percentage of freshmen (50%) was given a warning.

Table 2 highlights the preliminary majors that the academic difficulty groups chose at the time of application. Economics, PreMed, Biology, and Political Science were the most frequently chosen majors in both academic years examined.

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[2] Thirty-five of the forty students in academic difficulty during 1986-87 were personally interviewed by the Dean of Freshmen. Two other academic difficulty students spoke with Dean via the telephone.

[3] During the 1985-86 academic year, there were 1,263 first year students.

[4] The total number of freshmen for the 1986-87 academic year was 1,375.

TABLE 1
Probationary Status

| | AY 1985-86 | | AY 1986-87 | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| Probation Removed | 1 | 2.6% | 0 | 0.0% |
| No Action | 2 | 5.3% | 0 | 0.0% |
| Warning | 15 | 39.5% | 20 | 50.0% |
| Refer to Dean | 1 | 2.6% | 0 | 0.0% |
| Probation 1 | 6 | 15.8% | 16 | 40.0% |
| Probation 2 | 4 | 10.5% | 0 | 0.0% |
| Probation 3 | 6 | 15.8% | 3 | 7.5% |
| Withdraw - 1 Sem | 0 | 0.0% | 1 | 2.5% |
| Withdraw - 2 Sem | 3 | 7.9% | 0 | 0.0% |

TABLE 2
Majors at Application

| | AY 1985-86 | | AY 1986-87 | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| PreMed | 9 | 23.7% | 7 | 17.5% |
| Biology | 5 | 13.2% | 2 | 5.0% |
| Economics | 4 | 10.5% | 10 | 25.0% |
| Poli Sci | 4 | 10.5% | 4 | 10.0% |
| Drama | 2 | 5.3% | 0 | 0.0% |
| English | 2 | 5.3% | 2 | 5.0% |
| Museum | 2 | 5.3% | 1 | 2.5% |
| PreDental | 2 | 5.3% | 2 | 5.0% |
| Chemistry | 1 | 2.6% | 0 | 0.0% |
| Computer Sci | 1 | 2.6% | 1 | 2.5% |
| Child Study | 1 | 2.6% | 0 | 0.0% |
| History | 1 | 2.6% | 2 | 5.0% |
| Philosophy | 1 | 2.6% | 0 | 0.0% |
| Physics | 1 | 2.6% | 1 | 2.5% |
| Int. Rel. | 0 | 0.0% | 2 | 5.0% |
| Pre Vet | 0 | 0.0% | 2 | 5.0% |
| Math | 0 | 0.0% | 1 | 2.5% |
| Undecided | 2 | 5.3% | 3 | 7.5% |

**Demographics**

For both academic years examined, analysis was conducted to determine if there were significant differences between the academic difficulty group and the control group. Few discernible differences were identified.

For the 1985-86 analysis, no significant differences were found between the academic difficulty and the control groups on the following measures: gender, receipt of financial aid, on-campus residency, number of advanced placement credits received, and participation in athletics (Table 3). Males comprised 63 percent of the academic difficulty group and 57 percent of the control group. A little over 60 percent of each group received financial aid. Approximately 93 percent of the academic difficulty group as compared to 96 percent of the control group lived on-campus. With regard

to Advanced Placement credits; eight students in academic difficulty received 17 AP credits while twenty-two students in the control group amassed 34 AP credits. Examination of participation in university athletics revealed that eight individuals in the academic difficulty group participated in six different sports in comparison to the control group where eleven members participated in 10 different sports.

TABLE 3
Background Characteristics - AY 1985-86

| | AD Group | | Control Group | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| **SEX** | | | | |
| Males | 24 | 63.2% | 40 | 57.1% |
| Females | 14 | 36.8% | 30 | 42.9% |
| $X^2$ = .37 (1) NS | | | | |
| **FINANCIAL AID RECIPIENTS** | | | | |
| Yes | 23 | 60.5% | 43 | 61.4% |
| No | 15 | 39.5% | 27 | 38.6% |
| $X^2$ = .44 (1) NS | | | | |
| **CAMPUS RESIDENCY** | | | | |
| Yes | 35 | 92.1% | 67 | 95.7% |
| No | 3 | 7.9% | 3 | 4.3% |
| $X^2$ = .61 (1) NS | | | | |
| **ADVANCED PLACEMENT** | | | | |
| Yes | 8 | 21.1% | 22 | 31.4% |
| No | 30 | 78.9% | 48 | 68.6% |
| $X^2$ = 1.32 (1) NS | | | | |
| **ATHLETIC PARTICIPATION** | | | | |
| Yes | 8 | 21.1% | 11 | 15.7% |
| No | 30 | 78.9% | 59 | 84.3% |
| $X^2$ = .484 (1) NS | | | | |

Replication of this analysis for the 1986-87 population yielded similar results (Table 4). Males constituted the majority in both groups (60% of the AD group and 55% of the control group). A somewhat higher percentage (62.5%) of students in the academic difficulty group received financial aid than those in the control group (53.8%). Over eighty-five percent of both groups resided on-campus. Advanced Placement credits were earned by seventeen and one-half percent of students in the academic difficulty group as compared to thirty percent of the students in the control group. Four individuals in the academic difficulty group participated in two

university sports in contrast to the control group where seven members participated in five different sports. None of these differences were statistically significant.

TABLE 4
Background Characteristics - AY 1986-87

| | AD Group | | Control Group | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| **SEX** | | | | |
| Males | 24 | 60.0% | 44 | 56.4% |
| Females | 16 | 40.0% | 34 | 43.6% |
| $X^2$ = .14 (1) NS | | | | |
| **FINANCIAL AID RECIPIENTS** | | | | |
| Yes | 25 | 62.5% | 43 | 55.1% |
| No | 15 | 37.5% | 35 | 44.9% |
| $X^2$ = .59 (1) NS | | | | |
| **CAMPUS RESIDENCY** | | | | |
| Yes | 35 | 87.5% | 71 | 91.0% |
| No | 5 | 12.5% | 7 | 9.0% |
| $X^2$ = .35 (1) NS | | | | |
| **ADVANCED PLACEMENT** | | | | |
| Yes | 7 | 17.5% | 24 | 30.8% |
| No | 33 | 82.5% | 54 | 69.2% |
| $X^2$ = 2.17 (1) NS | | | | |
| **ATHLETIC PARTICIPATION** | | | | |
| Yes | 4 | 10.0% | 7 | 9.0% |
| No | 36 | 90.0% | 71 | 91.0% |
| $X^2$ = .05 (1) NS | | | | |

Those measures that differentiated between the academic difficulty group and the control group included SAT scores, high school rank and ethnicity (Tables 5, 6 and 7). For both freshman classes, the number of Blacks in academic difficulty was greater than would be predicted. For 1985-86 freshmen, the mean math and verbal SAT scores were 58.5 and 5.21, respectively; as compared to the average scores for the control group which were 63.4 for Math and 57.0 for Verbal. As in the previous year, average SATs for students in the academic difficulty group were significantly lower than those in the control group (54.2 VSAT & 59.5 MSAT vs. 56.96 VSAT & 62.63 MSAT).

## TABLE 5
## SAT SCORES

| | AD Group Range | AD Group Mean | Control Group Range | Control Group Mean |
|---|---|---|---|---|
| **AY 1985-86** | | | | |
| Math | 43-68 | 58.5 | 42-77 | 63.40 |
| Verbal | 37-67 | 52.1 | 38-71 | 57.04 |
| Math F = 13.23 p = .0005<br>Verbal F = 12.76 p = .0004 | | | | |
| **AY 1986-87** | | | | |
| Math | 42-75 | 59.46 | 42-74 | 62.63 |
| Verbal | 42-78 | 54.18 | 36-72 | 56.96 |
| Math $t$ = -1.73 $p < .05$<br>Verbal $t$ = 12.76 $p < .025$ | | | | |

## TABLE 6
## HIGH SCHOOL RANK

| | AD Group Range | AD Group Mean | Control Group Range | Control Group Mean |
|---|---|---|---|---|
| **AY 1985-86** | 23.5 - 98.2 | 73.5 | 17.76 - 99.6 | 85.8 |
| F = 7.24 p = .0084 | | | | |
| **AY 1986-87** | 41 - 98 | 78 | 58 - 99 | 90 |
| $t$ = -4.60 (91) $p < .005$ | | | | |

## TABLE 7[5]
## Ethnicity

| | AD Group Number | AD Group Percent | Total Population Number | Total Population Percent |
|---|---|---|---|---|
| **AY 1985-86** | | | | |
| Asian | 1 | 2.6% | 46 | 3.6% |
| Black | 9 | 23.7% | 50 | 4.0% |
| Hispanic | 0 | 0.0% | 17 | 1.3% |
| White | 22 | 57.9% | 1078 | 85.4% |
| Other | 1 | 2.6% | | |
| Unknown | 5 | 13.2% | 72 | 5.7% |
| **AY 1986-87** | | | | |
| Asian | 0 | 0.0% | 51 | 3.7% |
| Black | 6 | 15.0% | 67 | 4.9% |
| Hispanic | 2 | 5.0% | 28 | 2.0 |
| White | 26 | 65.0% | 1169 | 85.0% |
| Other | | | 0 | 0.0% |
| Unknown | 6 | 15.0% | 60 | 4.4% |

[5] Due to the difficulty in securing the ethnic distribution of the control group, the total population was used for comparison.

Further examination revealed that for the 1985-86 academic difficulty group, cumulative grade point average (GPA) was not significantly related to sex, ethnicity, receipt of financial aid, or residency. Similar findings were observed for those in the 1986-87 academic difficulty group with one exception: sex and cumulative GPA were significantly related, with males tending to have lower cumulative GPAs.

**Difficult Courses & Course Taking Patterns**

The courses in which students were enrolled were examined in an attempt to ascertain if the course taking patterns of the academic difficulty group were substantially different from those of their counterparts in the control group. In addition, specific courses were reviewed in order to identify those in which students appeared to have had the most difficulty.

In order to determine if the course taking patterns of the two groups were dissimilar, courses were categorized as either "Math/Science" or "Liberal Arts". This exercise revealed that regardless of their declared majors students in both groups, with the exception of those who were classified as undecided, were taking very similar types of courses. For the group of students who did not choose a major, more of the control group took Liberal Arts courses. In addition, course choice was examined to determine whether students were taking courses that were unrelated to their initial major. It was initially speculated that there might be a contingent of students who initially chose "Liberal Arts" majors, but were taking courses that were required of "Math/Science" majors. Of the five cases that seemed to meet the criteria of taking unrelated courses, only one was in the expected direction of "Liberal Arts" major to "Math/Science" major.

During the 1985-86 and 1986-87 academic years, students in the academic difficulty groups had the most trouble with Mathematics, Economics, and Biology courses.[6] There were no such departments or courses identified for the control group.

It was learned from the structured interviews that approximately 60 percent of the courses that caused students to be placed on academic probation had been taken in high school. Moreover, eleven of these courses had been difficult for these students while they were in high school. In general, students in the academic difficulty group indicated that the difficult courses were taken because they were seen as potential

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[6] These were the departments in which more than thirty-percent of the group made a D+ or lower.

majors, as providing career preparation, or because they fulfilled degree requirements. Additional reasons were volunteered with interest in a specific course being cited most frequently.

**Outside Activities**

Students in the academic difficulty group were queried to determine the extent to which they were involved in non-academic activities.[7] Twenty-six of the interviewed students (70%) were involved in extra-curricular activities, which on average required 8.19 hours per week. Thirteen students indicated that they were employed during the Fall 1986 semester. The number of hours worked averaged eleven per week. Approximately a quarter of the students interviewed indicated that they had jobs and participated in extra-curricular activities. The average number of hours spent per week for these two activities was 18.6.

**Expectations**

There was interest in determining what students expectations were concerning their performance at the university, the level of difficulty of college courses, and level of competition they would encounter at Tufts (Table 8). Students were asked what they thought their chances were of making at least a B average at Tufts. Approximately 69 percent of the students interviewed indicated that they thought that they had a "very good chance". Students were also asked what they thought their chances were of failing one or more courses at Tufts. Eighty percent of the students indicated that prior to starting college they thought that there was "no chance" that they would receive a failing grade.

There was a range in students' expectations regarding the level of difficulty and competition they would encounter at Tufts. Approximately fifty-five percent of those interviewed anticipated that courses would be difficult or very difficult. An even larger percentage (approximately 82 %) anticipated that the institution would be competitive or very competitive. Fifty-six percent of the students felt that their initial expectations regarding the difficulty of courses was confirmed. Approximately sixteen percent of those interviewed thought that the courses were easier than they anticipated. While the remaining twenty-one percent indicated that courses were more

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[7] There is no extracurricular (aside from athletics) or outside employment data on the control group so direct comparisons cannot be made in these areas.

difficult than they expected. With regard to academic competitiveness at Tufts, sixty-eight percent of those interviewed indicated that their initial assessments were correct. Twelve-percent of interviewees felt that Tufts was less competitive than they anticipated; while the remaining twenty percent felt that it was more competitive than they originally expected.

TABLE 8
Expectations

| | AD Group Number | Percent |
|---|---|---|
| **Chance of Making a B Average** | | |
| Some Chance | 6 | 20% |
| Very Good Chance | 24 | 80% |
| No response | 5 | |
| **Chance of Failing a Course** | | |
| No Chance | 28 | 80.0% |
| Very Little Chance | 3 | 8.6% |
| Some Chance | 3 | 8.6% |
| Very Good Chance | 1 | 2.8% |
| **Difficulty of Courses** | | |
| Not Difficult | 7 | 21.2% |
| A Little Difficult | 8 | 24.2% |
| Difficult | 13 | 39.4% |
| Very Difficult | 5 | 15.2% |
| No Response | 2 | |
| **Academic Competitiveness** | | |
| Not Competitive | 4 | 11.8% |
| A Little Competitive | 2 | 5.9% |
| Competitive | 20 | 58.2% |
| Very Competitive | 8 | 23.5% |
| No Response | 1 | |

**Resource Utilization**

Students were queried to ascertain at what point in the semester they realized that they were in academic difficulty. Approximately thirty-four percent (12 students) indicated that they realized they were in serious trouble during the first half of the semester – after their first exam. An additional twenty percent reported that they became cognizant of the fact around mid-terms. Twenty percent said they became aware of the problem during the second half of the semester. The remaining twenty-six percent indicated that they were unaware of the problem until it was too late (i.e finals, very end, never realized).

When asked what they did when they realized the they were in academic difficulty, the responses were varied. Fourteen students said that they studied harder

and tried to catch up. An additional ten students took a defeatist attitude – they "did nothing" and "just gave up". Six indicated that they sought help and an additional six indicated they dropped the course. "Talked to parents" was the course of action taken by one student.

Students were asked once they realized that they were in academic difficulty if they utilized any university resources. Nine students indicated that they sought no help and four said they relied solely on other students. The remaining twenty-two students reported that they did use some university-provided resources. Students tended to seek assistance from an academic advisor; the instructor of the course in which they were experiencing the difficulty; or other faculty members, including teaching assistants. Nine students indicated that they also went to the academic resource center.

**Other Factors**

In retrospect students were asked why they thought that they had gotten into academic difficulty. Table 9 highlights students' responses.[8] The most frequently cited responses were that they didn't work hard enough, they procrastinated or were concentrating on other matters. These findings closely parallel those of Hart and Keller who reported "freshmen placed the greatest responsibility for their low grades on their own lack of motivation, improper study habits, and inattention to school work" (p. 529).

TABLE 9
Other Factors

| Responses | Number | Percent |
|---|---|---|
| Didn't work hard enough, procrastination | 16 | 46% |
| Concentration on other things | 7 | 20% |
| Adjustment problems | 5 | 14% |
| Lack of enthusiasm, depressed | 3 | 9% |
| Overconfidence | 3 | 9% |
| Material too difficult | 3 | 9% |
| Racial issues | 2 | 6% |
| Structure of class | 1 | 3% |
| Illness | 1 | 3% |
| Late start | 1 | 3% |

[8] Please note that percentages do not total 100 as students provided multiple responses.

In addition to the open-ended question, students were asked several targeted questions concerning contributing factors. Specifically they were asked the following questions: 1) Were you poorly prepared academically for the particular course?, 2) Did you underestimate the difficulty of the material? 3) Was the method of instruction unfamiliar? and 4) Were there other outside (non-academic) factors (i.e. room-mate issues, problems with friends, personal illness, or problems with family) that contributed to your academic difficulty?.

Most students did not feel under-prepared for courses. Only eight students responded affirmatively to the first question. The majority of students felt that they had underestimated the difficulty of at least one course (20 students) and fifteen indicated that they found the method of instruction unfamiliar.

Most students indicated that they experienced some non-academic factors that contributed to their academic difficultly. Eight students experienced problems with room-mates; eight reported family-related problems, and seven had problems with friends. Seven students volunteered that more attention to friends and/or having fun contributed to their academic difficulty. An additional seven students reported being ill during the semester.

## CONCLUSION

Analysis revealed that there are very few measurable differences between the students who were experiencing academic difficulty and the control group. The main differences were that those students in academic difficulty tended to have lower SATs and lower high school class ranks. The course taking patterns between these two groups did not vary greatly. Students who were in difficulty did not appear to be taking heavier academic loads than their counterparts in the control group. However, specific courses were identified as being particularly troublesome for the academic difficulty group. In addition, grade point average was not significantly related to receipt of financial aid, residency (on or off-campus housing), or intended major. The correlation between cumulative GPA and SATs and high school rank were quite low.

Analysis of the structured interview data yielded some interesting findings. When queried what they did upon realization that they were in academic difficulty; students indicated a variety of actions: thirty-six percent indicated that they studied harder and tried to make up for lost time, twenty-nine percent said they did nothing and just gave up, fifteen percent indicated that they sought help, and an additional

fifteen percent indicated that they dropped the course. A somewhat surprising finding concerns students utilization of institutionally provided resources. Approximately 60 percent of the freshmen in academic difficulty indicated that they did not use any academic support services. Of those students who did use resources, the three most frequently cited sources of assistance were (1) an instructor or teaching assistant, (2) the academic resource center, or (3) an advisor.

It appears apparent that once these students realized that they were in academic difficulty they did not effectively handle the situation. For instance, the availability of resources is made known to all freshmen but for a variety of reasons this group did not take advantage of them. These findings suggest that the university should adopt a more active early intervention policy to insure better utilization of existing resources.

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# LINKING THE STRATEGIC PLANNING PROCESS TO THE COMMUNITY ASSESSMENT

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## Introduction

To date, the decade of the 1980's has been a period of deep introspection for many colleges and universities (Peterson, 1985). Primarily, this has resulted from the external environmental demographic fluctuations which have either resulted in and or combined with fiscal constraints to jeopardize the viability of these organizations (Cope, 1985; Hearn and Heydinger, 1985). Hence, the concept of strategic planning has gained widespread application as an important vehicle in prioritizing institutional goals and objectives for the appropriate allocation of limited resources (Bean and Kuh, 1984). However for strategic planning to be effective, pertinent data must be available (UhL, 1983). When properly presented, such data can facilitate necessary institutional mission statement revisions, thus establishing an atmosphere conducive to the strategic planning process (Pratt and Rachard 1983; Doucette et al, 1985; Parkh, 1975).

Because of their regional base and open door philosophy, community colleges must serve a wide spectrum of constituency groups (Cross, 1981). Yet, these institutions are encountering the same constraints as their senior higher education colleagues (Cope, 1985). Therefore, they can not be all things to all people (Cross, 1981), and must rely on some vehicle to maximize

their community based, performance oriented, mission (Armijoet et al, 1978). That vehicle can be the community assessment impact study.

The community assessment can provide data necessary to ascertain the economic, educational, social and technological impact the institution has on its service area. Concurrently, it can be used as a public relations, marketing and evaluative tool. Ultimately, such data can provide the impetus to review the institutional mission statement while providing direction to the strategic planning process. Once established, the strategic plans can be used by the institution to effectively lobby appropriate constituencies for additional resources. Fundamentally, it is the role of the institutional researcher to facilitate the planning, organization, and coordination of the community assessment, in addition to, analyzing and distributing its outcomes (Fenske, 1978; Armijoet et al, 1978).

Therefore, the purpose of this paper is two-fold: first, to describe the methodology being utilized by a small, rural, community college to conduct a community assessment study; and second, to summarize how the study outcomes will be linked to the institution's strategic planning process.

## Community Assessment Methodology

### Background

The following institutional characteristics provide the necessary background information required to gain a deeper insight to the rationale which initiated the methodology.

The institution is located in a rural, low population density

area (60,000 residents) of upstate New York. It is sponsored by two adjacent counties and has the largest service area (3512 square miles) of any public two year similar institution. There is one main campus, three branch campuses, six extension centers and five extension sites. There are approximately sixty full time faculty with over one hundred and fifty adjuncts. While the traditional college age student population has substantially declined in the last three years, the institution's enrollment has stabilized due to an expanded inmate education program. While the institution has a liberal arts and business focus in its major program offerings, approximately 12% of the matriculated students are in health care related majors.

Institutional financial resources are derived from state aidable FTE's, tuition, and county sponsor contributions. The latter sum is an equal amount which must be approved by both county legislatives.

The economy of the sponsor area is predominately tourist oriented with a number of service related occupations. The public sector is the number two employer with the majority of individuals working for the counties, state or townships. The number three employer is the construction industry. The number four employers are local private natural science research related firms.

The concept of a community assessment study was developed to ascertain both what impact the institution has had on its sponsor area while determining what impact it should have. The latter issue would be the key component in linking the assessment

to the institution's strategic planning process.

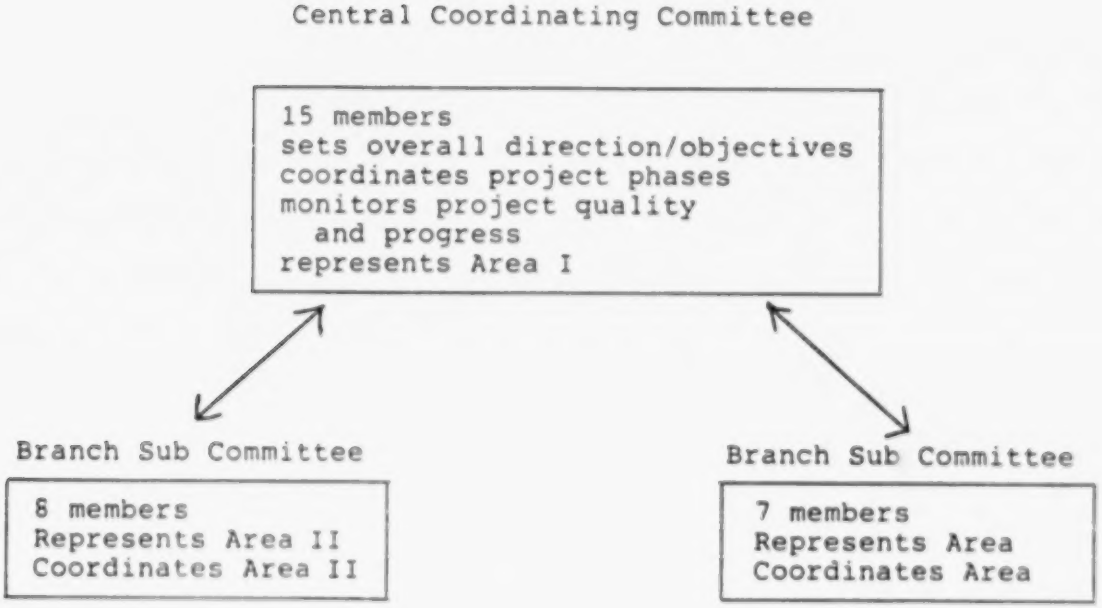
Committee and Objective Development

The institution developed an 8 fold methodology for conducting the assessment. The initial priority was the development and integration of a workable committee system which would allow input from appropriate internal/external constituents. The consensus reached was for one central coordinating committee with two sub-committees. The coordinating committee would have two functions: first, to set the direction/objectives for the assessment; and second, to represent the main campus. The sub-committees would respectfully represent the interests of the branch campuses. The central committee was composed of 15 members (chaired by the institutional researcher) including several prominent external constituents, a Board of Trustee member, several administrators, faculty, the chair of the Long Range Budget and Planning Committee, support staff, one representative from each sub-committee, and students. As opposed to appointing new committees for the branch campuses, it was decided to utilize their advisory groups as the sub-committees for assessment representation (see Figure I).

The second step in the assessment involved the development of assessment objectives. After the Long Range Budget and Planning Committee had affirmed the institution's mission statement and goals, the coordinating committee formulated 4 objectives which set the foundation for the assessment. These ranged from assessing perception of institutional strengths and weaknesses in the sponsor locations to identifying areas of future

Figure I

Committee Development



nesses in the sponsor locations to identifying areas of future institutional development (see Table I).

The third step evolved around deciding which format would be utilized for data collection. Due to the constraints of time and resources, it was decided to use objective questionnaires with space available for subjective comments. In addition, select constituents were chosen for personal interviews.

The fourth step involved the actual construction and testing of the questionnaire. It was decided after consultations with a variety of internal/external constituent groups to use a category ranking procedure for the questionnaire with specific sections being organized to meet the needs of each respective campus. (The questionnaire is presently being tested and revised.)

The fifth step involved a decision on how to distribute and retrieve the questionnaire. Because of the size and nature of the sponsor area and population, a decision was reached to distribute the questionnaires by concurrently inserting them in three major local newspapers with advanced publicity. In addition, questionnaires will be mailed to select local groups, business establishments and personalities. Retrivial will occur through stamped self-addressed envelopes and through designated drop-off locations.

The sixth step would involve developing appropriate procedures for the tabulation and analyses of the data. Ultimately, this will be decided by the number of returns. However, the questionnaires will be color coded so analyses will be available

Table I

Assessment Objectives

1. To ascertain the extent of institutional impact on the sponsor area in the following:
   a. general post-second education (credit/non credit)
   b. job training and placement
   c. public service

2. To publicize the role of the institution in the sponsor area:
   a. feedback
   b. admissions technique/tool for enrollment
   c. a vehicle for increased sponsor contribution

3. To ascertain institutional strengths & weaknesses in delivering services:
   a. course offerings
   b. new or marginal majors
   c. campus space and budget allocations

4. To ascertain what objectives need to be incorporated into the institution's strategic and long range plans.
   a. mission statement revision
   b. institutional concerns/deficiencies
   c. planning and budgeting process

5. A series of secondary objectives which include but are not limited to:
   a. analyses of data by biographical and demographic origin
   b. development of closer institutional liaisons with specific employers and personalities
   c. develop the potential for a speakers bureau

for each campus, in addition to, the entire institution.

The seventh step involved the development of a systematic flow chart with appropriate time tables and evaluation mechanisms to ascertain the extent and quality of progress. As with all such projects in complex organizations, this one has fallen behind in schedule. Nonetheless, there is general agreement that the quality of the project and its expected outcomes have not been affected.

The final step involved the detailed presentation of the methodology to appropriate internal/external groups with a request for an adequate budget. At this date, the budget has been approved with an additional potential contingency for the unexpected. This was the final endorsement necessary to prove the worth of the project.

## Strategic Planning Linkage

After the data have been tabulated and analyzed a series of reports will be developed on the study outcomes. These will be presented to the college community, the Long Range Budget and Planning Committee, the Board of Trustees and the public. Based on these reports, the College Planning Committee will set an agenda to redirect (if appropriate) the institution's strategic plans. The first step in this agenda will be an extensive review of the institution's mission statement and goals. Do the mission statement and goals adequately define what the institution represents and should represent? What changes are necessary? Based on those changes what weaknesses must the institution identify and overcome to achieve those

goals? Based upon the preceding, the institution will initiate an extended indepth self-study. What programs are obsolete? What new programs are needed? Is space allocation, personnel and specific goals for each program, division and campus adequate and futuristic oriented? Ultimately, the institution will set an agenda for its strategic plans which will coincide with the extalished planning and budget process.

Significance/Conclusions

The community assessment described in this paper is being conducted in a rural, geographically dispersed, economically depressed area of upstate New York. The college has identified 4 assessment objectives. The accomplishment of these objectives are not intended to be an end all by themselves but the beginning of an extended on-going self-study process. While the study has several functions, its outcomes will be primarily utilized to define and refine the institution's strategic planning processes and plans. Concurrently, it is expected that the study processes will bring a sense of community to this community college while creating an environment conducive to change and innovation.

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# THE INTEGRATION OF A POST-GRADUATION ACTIVITIES SURVEY

## FOCUS

Both University administrators and college (or unit) career counselors increasingly need sound data which shows the outcomes of graduates. While the needs of these two groups may differ within an institution, it is important to understand the advantages of jointly collecting data from graduates without duplicating effort.

The purpose of this paper is to describe how to effectively integrate a post-graduation activities survey at a large university. Among the topics addressed will be:

1) The role of the "central" institutional research office.
2) Data management vs. data ownership.
3) Cost benefit factors.
4) Multiple data applications.

## HISTORY

At Cornell University, seven separate undergraduate colleges co-exist. Prior to 1984, most colleges conducted independent and different annual studies on the post-graduate activities of degree recipients. Increasingly, Cornell "central" administrators wanted to know the outcomes of graduates for the University as a whole. Since the existing data were inconsistent, a system was needed to collect data that would meet the needs of University administrators as well as the college Deans and career counselors.

In 1982-83, the Office of Institutional Planning and Analysis developed a proposal which recommended that the efforts of each individual college be combined. At this

stage, the "central" institutional research office assumed the role of project designer and leader. A major component of the proposal was the suggestion to create an institution-wide survey. It was assumed that the combined efforts would reduce costs and allow for a joint sharing of project responsibilities.

An attractive feature for the colleges was and continues to be the financial support provided by the University administration. Long term goals of the combined study include a resurvey of graduates at five and ten year marks.

## APPROACH

In order to better explain the steps involved in completing a project of this type, I have developed an illustration which shall be referred to as the "funnel" model (see Figure 1). The primary shape of the model suggests that, at Step I, the common needs of all project members are identified. In Step II, the data collection is "streamlined" through a central office which results in economy of effort and resources. In the final stages of the model, Step III, data is disseminated.

### STEP I:

- Review individual college (or unit) surveys and develop a university-wide survey which allows for the incorporation of all desired core data.

  At Cornell, discussions included reviewing the various survey designs of each of the seven undergraduate colleges and deciding (as a group) on the data needs. For many college representatives, cooperation and compromise was necessary. A project of this kind requires a framework that reasonably accommodates each member. To help explain how the Office of Institutional Planning and Analysis (IPA) was able to successfully unify all of the project members, an appropriate reference to participatory research comes from Burch, Strater and Grudnitski and their work in Information Systems: Theory and Practice:

## FUNNEL MODEL

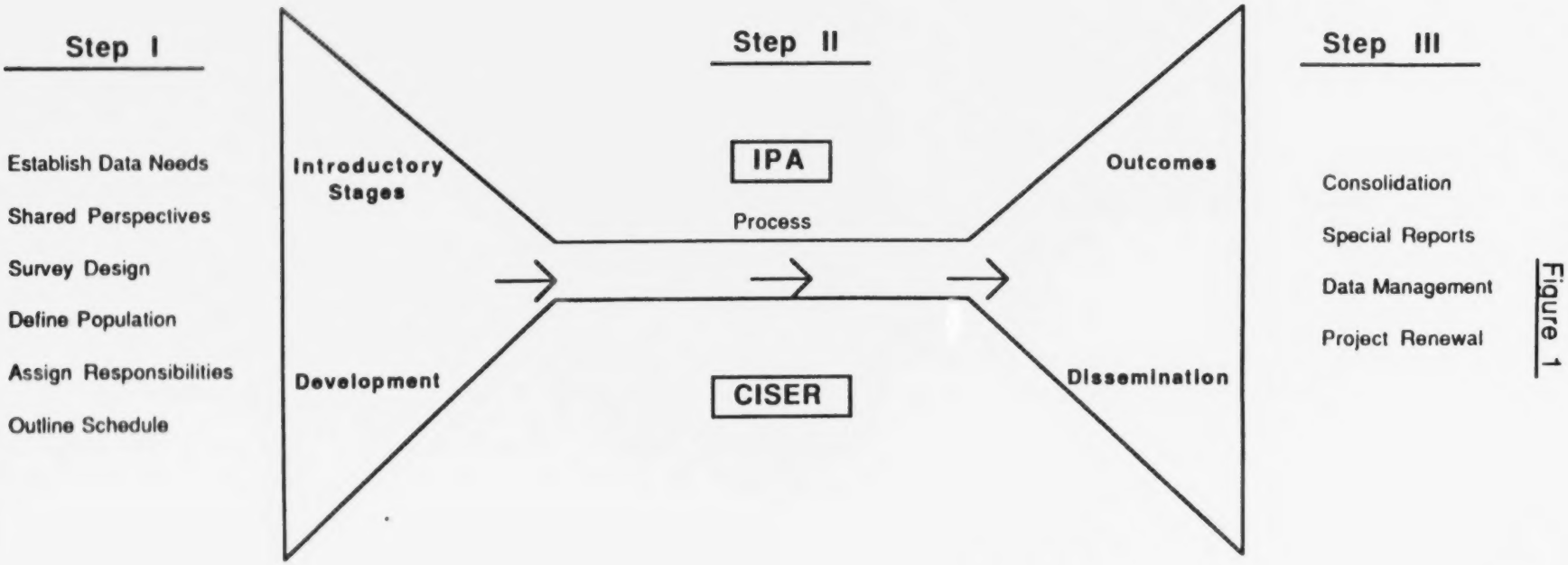



Figure 1

> *If the participative change strategy is to be successful, then the analyst (or organizing unit) must possess a certain amount of influence over the individuals who will experience the impact of the change. Additionally, the group targeted for the change must be self-motivated and relatively independent.* 1/

In other words, IPA was able to exhibit limited control over the project while maintaining a sense of autonomy. The conception of the survey instrument was developed by the group, with final design accomplished through IPA and the Cornell Institute for Social and Economic Research (CISER).

**STEP II:**

. Define the survey population and outline a completion schedule for the project.

The survey population at Cornell is defined as <u>all</u> Bachelor's degree recipients and <u>all</u> Master's degree recipients. PhD and professional school degree recipients are not included. (See Attachment A). A completion and division of labor schedule is also incorporated (see Attachment B).

**STEP III:**

. Establish data management issues of ownership and maintenance.

Since previously the data were collected separately at Cornell, it was decided to "house" the final datasets with IPA. IPA is also responsible for generating final and ad hoc reports (data dissemination), as well as functioning as the central organizing unit of the annual study. CISER is responsible for issues relating to "creating" the dataset, such as data coding and verification.

---

1/ John G. Burch, Jr., Felix R. Strater, Gary Grudnitski. <u>Information Systems: Theory and Practice</u>. 2nd ed. New York: John Wiley & Sons, 1979.

## RESULTS

The results of the Cornell University Post-Graduation Activities Survey are shared with many campus constituencies. Three years of experience (since the project began) have resulted in a more timely and efficient process for collecting data. Having the final reports generated by Institutional Planning and Analysis has given a "value added" perspective to the entire study. Since the college reports have been customized to meet the needs of each individual college, Institutional Planning and Analysis suggested adding certain "by college" comparison tables. This addition has given the colleges new perspectives regarding their data.

All of the undergraduate career and placement offices use the survey results to shape and evaluate their career planning programs. Many of the colleges also prepare a written report summarizing the data supplied through Institutional Planning and Analysis.

Institutional Planning and Analysis shares the information with the central administration executive staff as part of the quarterly reports, Cornell Indicators. In addition, longitudinal data series are prepared as part of the Cornell University Fact Book.

The University Career Center shares the information through an annual report which shows the successes of the most current year's class. The information is also provided to the Cornell News Service; through their press release the information is shared with the public.

## APPLICATIONS

Recently Institutional Planning and Analysis has integrated varying uses of the data in the following ways:

1) Merging the results with financial aid files to show outcomes of those graduates with demonstrated need vs. those without demonstrated need for financial aid; evaluating the relationship between debt load (e.g. packaged loan amounts) and starting salaries; and, determining longitudinal behavior patterns among the different need groups (grant recipients, self-help only, etc.).

2) Sharing new address information with the Office of Alumni Affairs/Public Records.

3) Integrating the project design/results with other University projects (e.g. **Cornell Tradition** project).

4) Combining the results of three graduating classes (to date) to show the University average over a three year period.

5) Preparing individual datasets "by college" which provides the respective college career planning representatives the ability to manipulate and customize their own results.

Future plans may include sharing a summary of the study with all of the graduates who responded to the survey.

## SUMMARY

The effectiveness of integrating a post-graduation activities survey depends largely on the role established by the central Institutional Research Office.

At Cornell, it is important to note that there have been individual career coordinators who were hesitant about certain aspects of the project. In particular, the development of the current university survey instrument meant the exclusion of certain types of questions. However, agreement was reached because each member realized the eventual benefits of jointly collecting data.

The advantages to the colleges have been numerous. For example, two of the college career coordinators had never previously conducted formal survey research. Now, they are able to share results of the project in a consistent fashion with deans, faculty, and admissions and development staffs.

In summary, the successes of the annual Post-Graduation Activities Survey are the result of "service-oriented" teamwork, accommodation, and hard work.

Attachment A

## FILE DEFINITION AND VARIABLES

**Population**

All Bachelor's and Master's degree recipients (exclude PhD and professional degree recipients), for calendar year (January, May, and August).

**Variables From Registrar**

a. Student's Name
   - First Name
   - Middle Name
   - Last Name

b. Student's Cornell ID Number
c. Social Security Number
d. Home Address (permanent)
   - Street
   - City
   - State
   - Zip Code
   - Postal Code

e. Home Phone Number (permanent)
f. Country
g. Date of Graduation
   - Month
   - Year

h. Degree Received (code)
i. Major (code)
j. Gender (code)
k. Ethnic (code)
l. College (conferring degree)
m. Citizenship
n. External Transer (C.E.E.B.) Code
o. Marital Status
p. Date of Birth
q. Residence at Time Admitted
   - Country
   - State
   - County

r. Chairman's College (graduate students only)

NOTE: For initial file request, additional variables containing local address are added to allow local distribution of surveys.

Attachment B

## COMPLETION SCHEDULE AND DIVISION OF LABOR

| | |
|---|---|
| **April** | . Request dataset from Registrar to include January "official" degree recipients and May "expected" degree recipients (IPA). |
| | . Prepare and "clean" dataset for generation of letters (IPA). |
| | . Generate personalized letters to be sent to all graduates with survey and stamped return envelope (CISER). |
| | . Send first mailing and/or distribute locally on-campus (CISER and Colleges). |
| **May** | . Collect survey responses on a regular basis and determine primary status of graduates. Code and enter responses through selected integrated software package (CISER). |
| | . Send follow-up postcard ten days after initial late April mailing (CISER). |
| | . Send follow-up letter with another survey to all non-respondents at the four-week mark (CISER). |
| **June** | . Request dataset from Registrar's Office to include "official" conferred degree recipients in May (IPA). |
| | . Review response rates by college/school with entire Post-Graduate Management Group. |
| **July and August** | . Prepare and update dataset for future mailings and report generation based on latest response information (CISER). |
| **September** | . Review response rates by college at mid-month Management Group meeting. |
| | . Request dataset from Registrar to include August "official" degree recipients (IPA). |
| | . Generate preliminary data reports, by college (IPA) |
| **October** | . Prepare and "clean" dataset for generation of letters for fall follow-up of January and May graduates and all new August graduates (IPA). |
| | . Send first fall mailing (CISER). |

Attachment B (continued)

| | | |
|---|---|---|
| **November** | . | Send follow-up postcard ten days after fall mailing (CISER). |
| | . | Send second fall mailing to non-respondents (CISER). |
| | . | Continue updating and coding of survey responses through integrated software package (CISER). |
| **December** | . | Generate second round of preliminary data reports (IPA) |
| | . | Review most current response rate information with entire Post-Graduate Management Group. |
| **January** | . | Establish last date to receive and include survey responses (Management Group). |
| **February** | . | Prepare **final** dataset. Upload dataset for conversion to SAS dataset (CISER and IPA). |
| | . | Begin generating **final** individual college and university reports for review (IPA). |

# MULTIPROJECT MANAGEMENT
# USING THE HARVARD TOTAL PROJECT MANAGER

Thomas Wickenden
Director of Institutional Research and Program Development

Tompkins Cortland Community College

Institutional researchers typically deal with a multiplicity of different projects. These projects have different resource requirements, they have different due dates and different priorities. Yet institutional research offices have limited resources. Managing these multiple projects becomes a major task as colleges ask the office of institutional research to take on more work in areas such as planning, enrollment management, marketing, assessment, etc.

Some of the questions that have to be answered in order to manage an office of institutional research effectively include the following:

(1) Can you effectively take on another project?

(2) If you take on another project, how will the due date and resource requirements of that project effect the progress of current projects?

(3) Is there any slack in the current schedule of projects where additional tasks could be inserted?

(4) What are the critical dates by which you should have begun the activities needed to complete each project on time?

(5) Will you experience a crunch time when additional resources will be required?

(6) What impact will normal committee work and vacation time (for you and your staff) have upon project completion?

(7) If a project falls behind schedule, how can you adjust due dates and resource allocation so that you can catch up without adversely impacting other projects?

Project management software such as the Harvard Total Project Manager offers assistance in answering questions such as these. While an investment is required to purchase, learn, and to implement software such as this, and while you must sometimes fit your project information into a format that is awkward, this type of management tool is worth knowing about and may be worth trying.

Perhaps the key feature of this software is that it tracks the resources and durations of all projects that are described, and thereby it can answer any of the questions described above as you build an initial schedule of projects, add additional projects, elaborate the microstructure of projects and tasks, and monitor the progress of all projects and subprojects.

Project Structure

Projects can be related to each other in two basic ways through this type of software. In the first place, each project that make use of a resource will add to the loading and schedule of that resource. If a resource is scheduled to be overused, the software alerts you to this fact so that you can alter your schedule or add to your resource base.

In the second place, it is possible to describe one project in such a way that it becomes a subproject of another. In this way, all the major projects in an office of institutional research can be tied together at the highest level. This allows for a comprehensive graphic representation of the research project structure, resource allocation and scheduling, as well as for detailed analysis of tasks and progress at the level of the individual project.

For example, Figure 1 below describe a list of projects for an office of institutional research. DEVELOP, MARKET, REVIEWS and SUNY are all subprojects of a superproject named IRPD, which stands for the Office of Institutional Research and Program Development. The hierarchical relationship between subprojects and superprojects means that any change or progress in the subprojects is automatically posted to the comprehensive representation of the set of projects in IRPD. There are, in addition, several minor tasks that are described only at the level of IRPD.

MEETINGS and VACATION are set up as independent "projects" because they are not projects, per se. MEETINGS allows for a description of committee work and other time that must be spent out of the office on business matters unrelated to the projects of the office. VACATIONS allows for a description of vacations and breaks that affect all human resources upon which projects are based. In addition, holidays, weekends, etc., are taken care of by developing a calendar unique to the institution (TC3).

Figures 2-4 describe various versions of the flow of tasks which make up the projects in IRPD. Figure 5, however, shows the task structure of one of these projects, REVIEWS. This is the lower-level flowchart or "roadmap."

Task Structure

Figures 2-5 also demonstrate the two basic relationships between tasks: serial and parallel. The words in the boxes describe "milestones," which are necessary to begin and end tasks and to join parallel tasks. Unlike tasks, milestones have no duration. However, it is with milestones that due dates (know in the HTPM as constraints) enter the analysis.

Figure 6 describes the schedule of tasks for the subproject REVIEWS. The schedule is useful for seeing the big picture, and it is revised to indicate progress as tasks are finished. Figure 7 also lists each task in the project REVIEWS but in the format that serves as a "TO DO" list.

Resources

Figure 8 is a resource list for all the projects undertaken by the Office of Institutional Research and Program Development. The allocation of these resources to the projects of the office are described in figures 9-11. Figure 9 is a comprehensive listing of resources for each project, while Figure 10 and Figure 11 describe the resource DIRECTOR. Figure 10 describes the "loading" or use of this resource graphically along a timeline, while Figure 11 is a typical "GANT Chart" depicting each allocation of this resource as a bar, once again along a timeline.

Project Management

It is important to note that once projects are set up they must be monitored in order for the software to remain useful in the management of on-going projects. The HTPM software provides useful forms such as that described in Figure 12 on which to record the progress on each task of each project. In addition, unlike wallcharts, calendars, and other project management "hardware," in which all dates must be manually updated every time one critical date changes, software such as the HTPM adjusts all subsequent dates every time any critical date is changed, based upon knowledge of the duration and relation between tasks. Thus as new information on the status of each project is entered, all the preceding figures are revised to reflect progress on these projects. Clearly this is one of the major advantages of project management software!

Conclusions

For an office with a multiplicity of projects and limited resources, project management software such as the Harvard Total Project Manager can be useful in helping to schedule tasks, allocate resources, track progress and revise plans. However, while it will save time and increase efficiency in the long run, it requires a major investment of time and human resources for initial implementation as well as for continual updating of the status of each project.

## FIGURE 1

Project list

9-Jan-1987 Page 1

| Project | Calendar | Super-Proj<br>Description | Responsible | Start | Finish | Planned Cost<br>Actual Cost | Work Done<br>(%) |
|---|---|---|---|---|---|---|---|
| DEVELOP | TC3 | IRPD<br>DEVELOPMENT OF NEW PROGRAM(S) | DIRECTOR | 9-Jan-1987 | 5-Apr-1988 | 0.00<br>0.00 | 0 |
| IRPD | TC3 | INSTITUTIONAL RESEARCH AND PROGRAM DEVELOPMENT | DIRECTOR | 1-Sep-1987 | 1-Sep-1988 | 3454.22<br>0.00 | 0 |
| MARKET | TC3 | IRPD<br>MARKETING RESEARCH | DIRECTOR | 9-Jan-1987 | 15-Feb-1988 | 0.00<br>0.00 | 0 |
| MEETINGS | TC3 | COMMITTEE MEETINGS | DIRECTOR | 1-Sep-1987 | 1-Sep-1988 | 0.00<br>0.00 | 0 |
| REVIEWS | TC3 | IRPD<br>PROGRAM & SERVICE REVIEWS | DIRECTOR | 15-Sep-1987 | 2-Feb-1988 | 3424.22<br>0.00 | 0 |
| SUNY | TC3 | IRPD<br>SUNY SURVEYS AND FILES | DIRECTOR | 1-Sep-1987 | 1-Sep-1988 | 0.00<br>0.00 | 0 |
| VACATION | TC3 | IRPD<br>VACATIONS & BREAKS | TC3 | 1-Sep-1987 | 30-Aug-1988 | 1750.00<br>0.00 | 0 |

## FIGURE 2

Project: IRPD 20-Oct-1987 Page 1

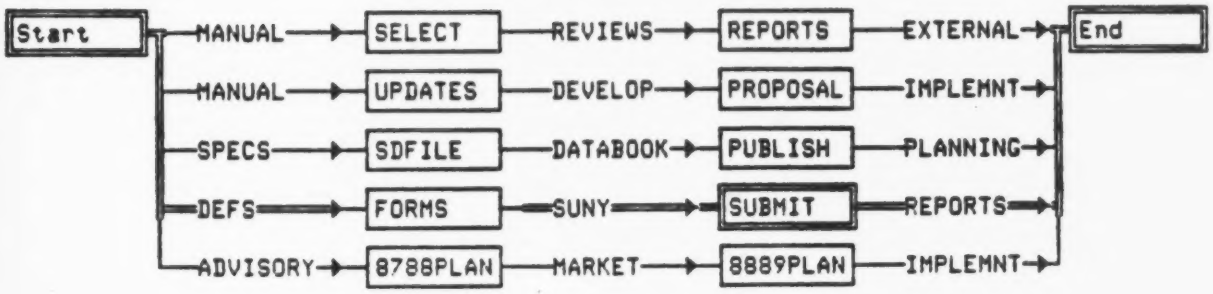


FIGURE 3

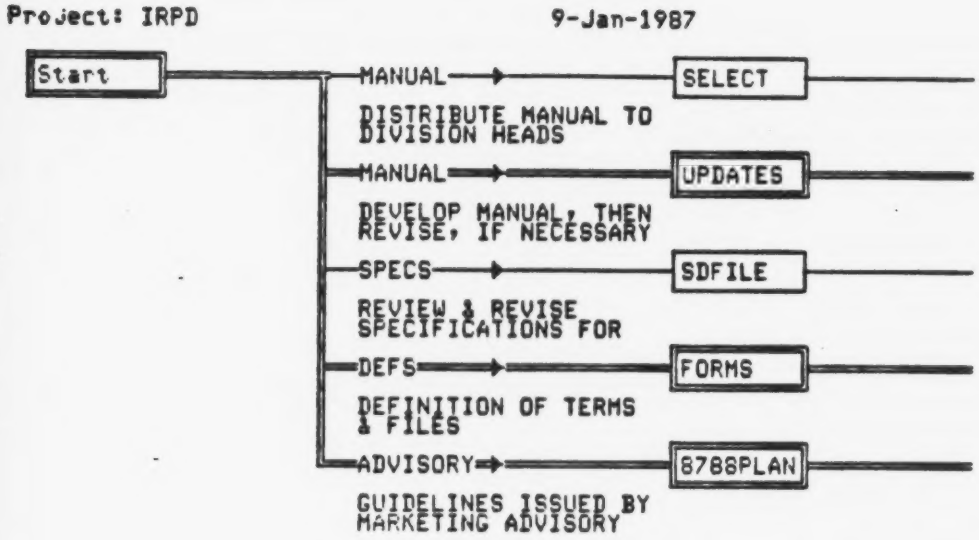



FIGURE 4

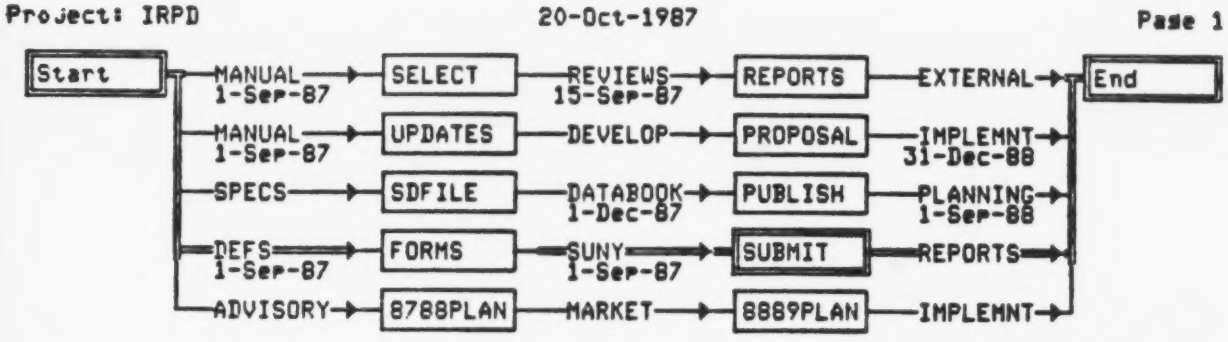


FIGURE 5

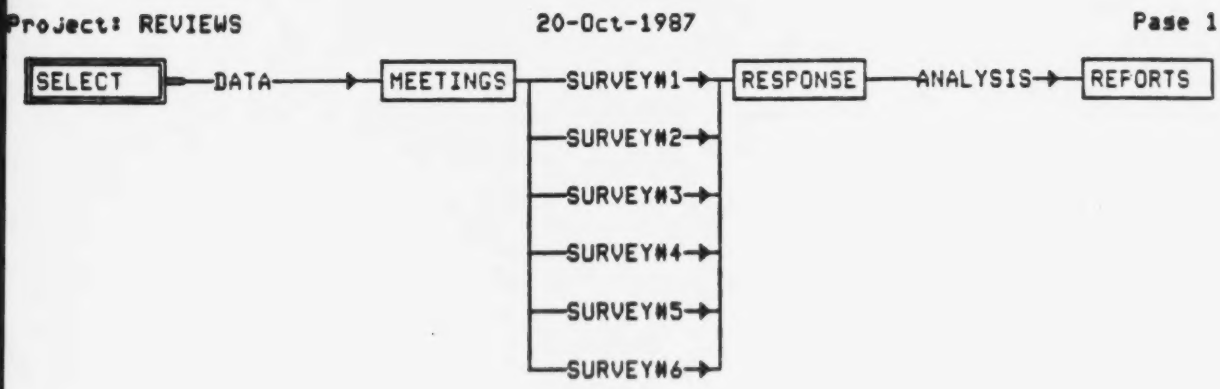



FIGURE 6

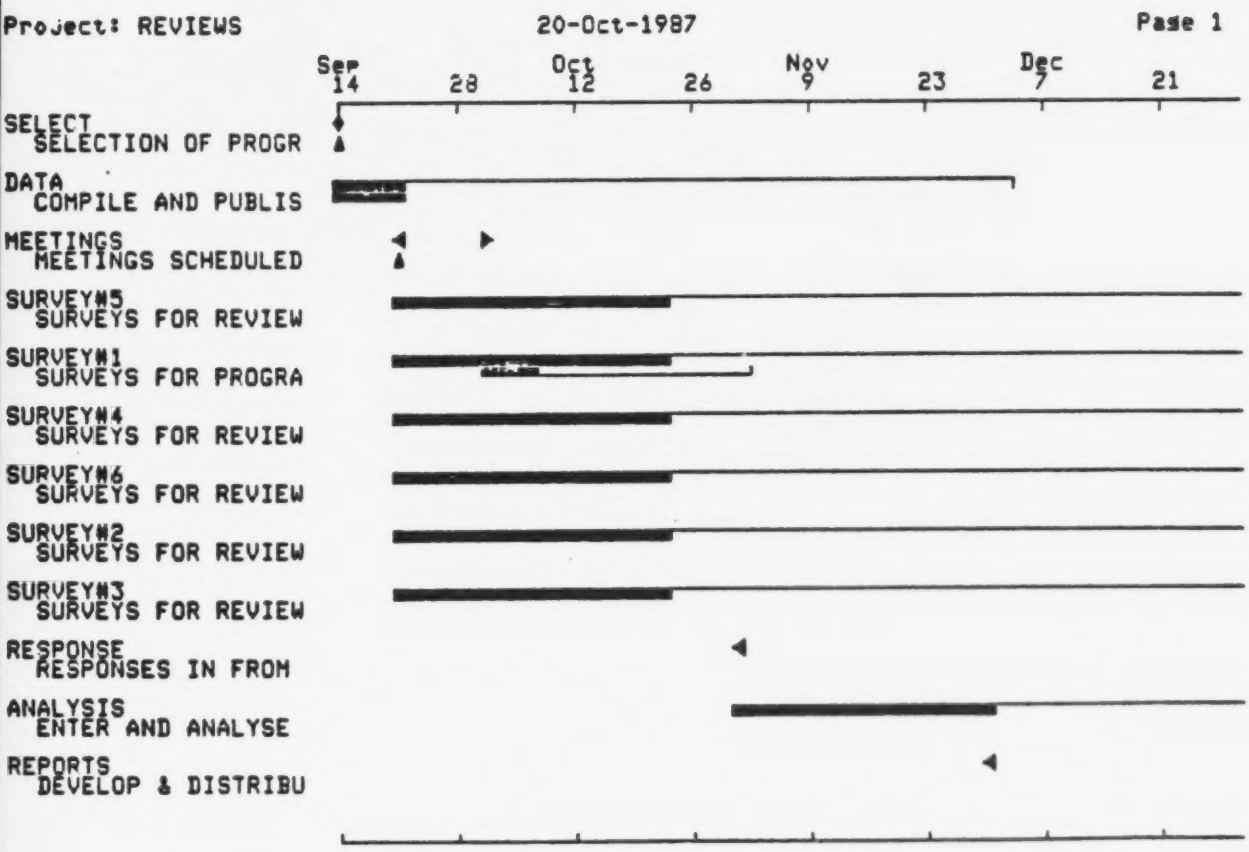


FIGURE 7

Project: REVIEWS 20-Oct-1987 Page 1

| Name | Responsible Code | Duration Description | Slack | Start date | Finish date | % Complete |
|---|---|---|---|---|---|---|
| SURVEY03 | DIRECTOR | 1.00 Mth E<br>SURVEYS FOR REVIEW 03 | 72.12 Dys E | 22-Sep-1987 | 22-Oct-1987 | 0 |
| SURVEY02 | DIRECTOR | 1.00 Mth E<br>SURVEYS FOR REVIEW 02 | 72.12 Dys E | 22-Sep-1987 | 22-Oct-1987 | 0 |
| SURVEY05 | DIRECTOR | 1.00 Mth E<br>SURVEYS FOR REVIEW 05 | 72.12 Dys E | 22-Sep-1987 | 22-Oct-1987 | 0 |
| SURVEY06 | DIRECTOR | 1.00 Mth E<br>SURVEYS FOR REVIEW 06 | 72.12 Dys E | 22-Sep-1987 | 22-Oct-1987 | 0 |
| SURVEY04 | DIRECTOR | 1.00 Mth E<br>SURVEYS FOR REVIEW 04 | 72.12 Dys E | 22-Sep-1987 | 22-Oct-1987 | 0 |
| SURVEY01 | DIRECTOR | 1.00 Mth E<br>SURVEYS FOR PROGRAM REVIEW 01 | 72.12 Dys E | 1-Oct-1987 | 31-Oct-1987 | 25 |
| ANALYSIS | DIRECTOR | 1.00 Mth E<br>ENTER AND ANALYSE DATA FROM SURVEYS | 63.12 Dys E | 31-Oct-1987 | 1-Dec-1987 | 0 |

FIGURE 8

Resource list

9-Jan-1987 Page 1

| Name | Responsible Code<br>Description | Quantity | Time Unit | Unit Cost |
|---|---|---|---|---|
| DIRECTOR | ACADEMC DEAN<br>DIRECTOR OF INSTITUTIONAL RESEARCH & PROGRAM DEVELOPMENT | 1.00 | Days | 100.00 |
| INTERN | DIRECTOR<br>STUDENT INTERN | 0.20 | Days | 0.00 |
| SECRETRY | DIRECTOR<br>SECRETARY | 0.50 | Days | 50.00 |
| WORKSTUD | DIRECTOR<br>WORKSTUDY STUDENT | 0.40 | Days | 0.00 |

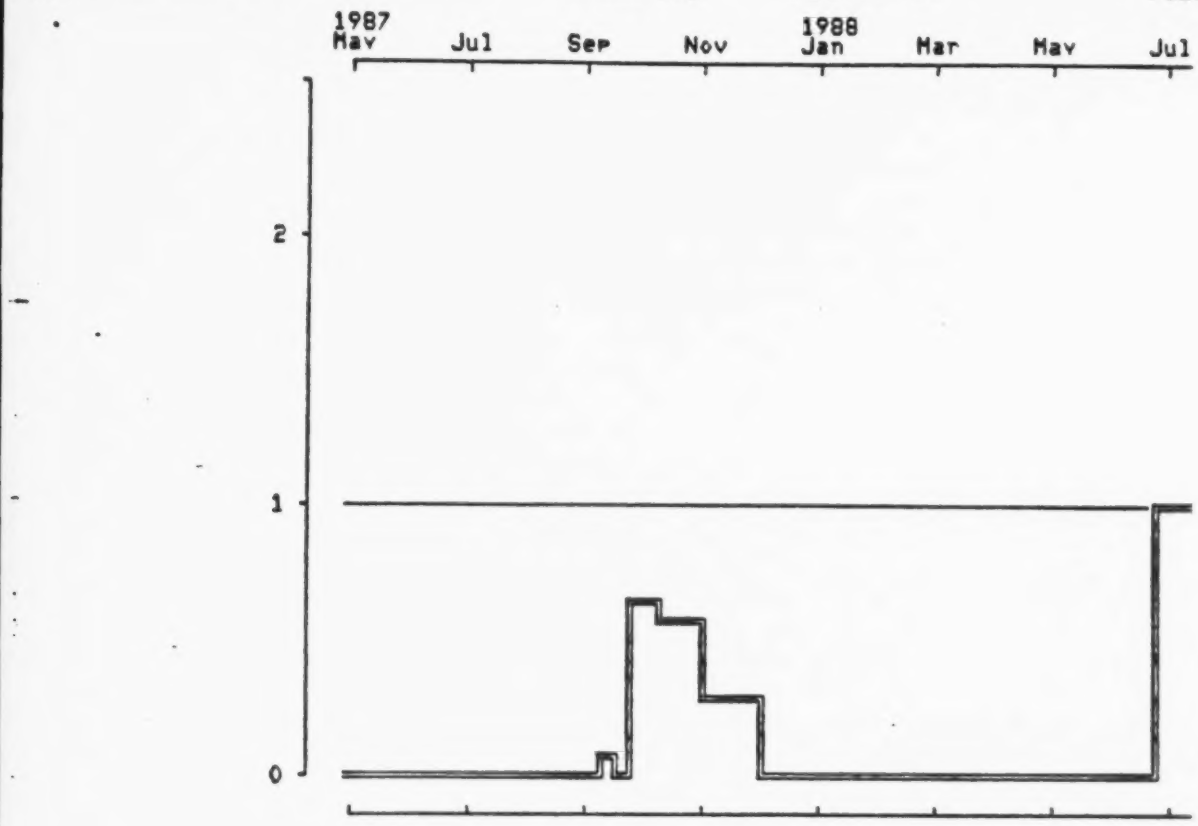
# FIGURE 9

Project resource list

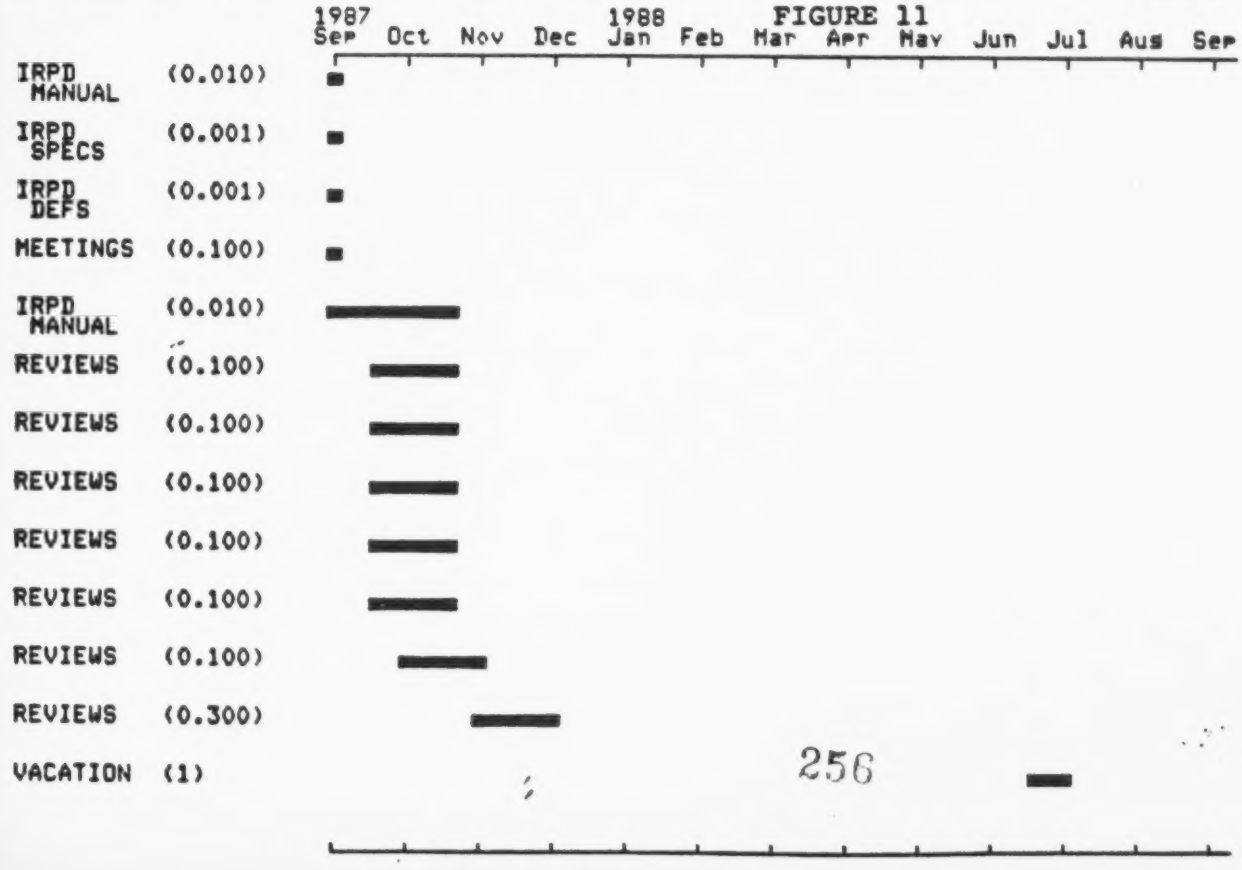
20-Oct-1987 Page 1

| Project Name | Task Name | Start | Finish | Resource | Quantity | Planned Duration / Planned Cost | Actual Duration / Actual Cost |
|---|---|---|---|---|---|---|---|
| VACATION | | 1-Aug-1988 | 15-Aug-1988 | | | 2.00 Wks E | |
| | | | | SECRETRY | 0.500 | 350.00 | 0.00 |
| VACATION | | 20-Jun-1988 | 4-Jul-1988 | | | 2.00 Wks E | |
| | | | | DIRECTOR | 1.000 | 1400.00 | 0.00 |
| VACATION | | 23-May-1988 | 30-Aug-1988 | | | 3.25 Mth E | |
| | | | | INTERN | 0.200 | 0.00 | 0.00 |
| | | | | WORKSTUD | 0.400 | 0.00 | 0.00 |
| VACATION | | 16-May-1988 | 23-May-1988 | | | 5.00 Dys W | |
| | | | | INTERN | 0.200 | 0.00 | 0.00 |
| | | | | WORKSTUD | 0.400 | 0.00 | 0.00 |
| VACATION | | 28-Mar-1988 | 4-Apr-1988 | | | 1.00 Wks E | |
| | | | | INTERN | 0.200 | 0.00 | 0.00 |
| | | | | WORKSTUD | 0.400 | 0.00 | 0.00 |
| VACATION | | 16-Dec-1987 | 23-Dec-1987 | | | 5.00 Dys W | |
| | | | | INTERN | 0.200 | 0.00 | 0.00 |
| | | | | WORKSTUD | 0.400 | 0.00 | 0.00 |
| IRPD | | 1-Sep-1987 | 1-Sep-1987 | | | | |
| | | | | DIRECTOR | 0.010 | 0.00 | 0.00 |
| | | | | SECRETRY | 0.010 | 0.00 | 0.00 |
| IRPD | | 5-Sep-1987 | 20-Oct-1987 | | | 20.00 Dys W | 31.37 Dys W |
| | | | | DIRECTOR | 0.010 | 20.00 | 31.37 |
| | | | | SECRETRY | 0.010 | 10.00 | 15.69 |
| IRPD | | 1-Sep-1987 | 1-Sep-1987 | | | | |
| | | | | DIRECTOR | 0.001 | 0.00 | 0.00 |
| IRPD | | 1-Sep-1987 | 1-Sep-1987 | | | | |
| | | | | DIRECTOR | 0.001 | 0.00 | 0.00 |
| MEETINGS | | 1-Sep-1987 | 1-Sep-1987 | | | | |
| | | | | DIRECTOR | 0.100 | 0.00 | 0.00 |
| REVIEWS | ANALYSIS | 31-Oct-1987 | 1-Dec-1987 | | | 1.00 Mth E | |
| | | | | DIRECTOR | 0.300 | 913.13 | 0.00 |
| | | | | SECRETRY | 0.300 | 456.56 | 0.00 |
| | | | | WORKSTUD | 0.300 | 0.00 | 0.00 |
| REVIEWS | SURVEY#1 | 1-Oct-1987 | 31-Oct-1987 | | | 1.00 Mth E | |
| | | | | DIRECTOR | 0.100 | 304.37 | 0.00 |
| | | | | SECRETRY | 0.010 | 15.22 | 0.00 |
| | | | | WORKSTUD | 0.010 | 0.00 | 0.00 |

Resource: DIRECTOR 9-Jan-1987 FIGURE 10 Page 1




Resource: DIRECTOR 20-Oct-1987 FIGURE 11 Page 1



Task progress

**FIGURE 12**

Project: REVIEWS 20-Oct-1987 Page 2

---

TASK: DATA
Description: COMPILE AND PUBLISH INSTITUTIONAL DATA ON PROGRAMS UNDER REVIEW

| | Start | Finish | Duration |
|---|---|---|---|
| Planned: | 15-Sep-1987 | 22-Sep-1987 | 1.00 Wks W |
| Actual: | | | 5.00 Dys W |
| Earliest: | 15-Sep-1987 | 22-Sep-1987 | |
| Latest: | 24-Nov-1987 | 3-Dec-1987 | |
| Baseline: | | | |

Responsible: DIRECTOR
Code:
Subproject:

Slack: 50.37 Dys W
100 % Complete

| | Planned Cost | Actual Cost |
|---|---|---|
| Resource: | 0.00 | |
| Other: | 0.00 | |
| Total: | 0.00 | |

Comments:

---

# THE IMPACT OF COLLEGE EXPERIENCES ON THE INTELLECTUAL GROWTH OF TRANSFER STUDENTS

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## PURPOSE AND CONCEPTUAL FRAMEWORK

This investigation examines the relationships between student intellectual growth and previous university experiences for a population of transfer students from two-year and four-year college campuses. In so doing, we draw key elements from the Albany assessment model and test its appropriateness.

The conceptual framework for this research is provided by the literature which views student growth and achievement as products of both personal traits and collegiate experiences. Several authors have linked the role of schooling in general and college education in particular to subsequent attainment, and the longitudinal impacts of colleges and universities on their students have been the focus of much discussion and study (Astin, 1977; Bowen, 1977; Chickering, 1969; Feldman and Newcomb,

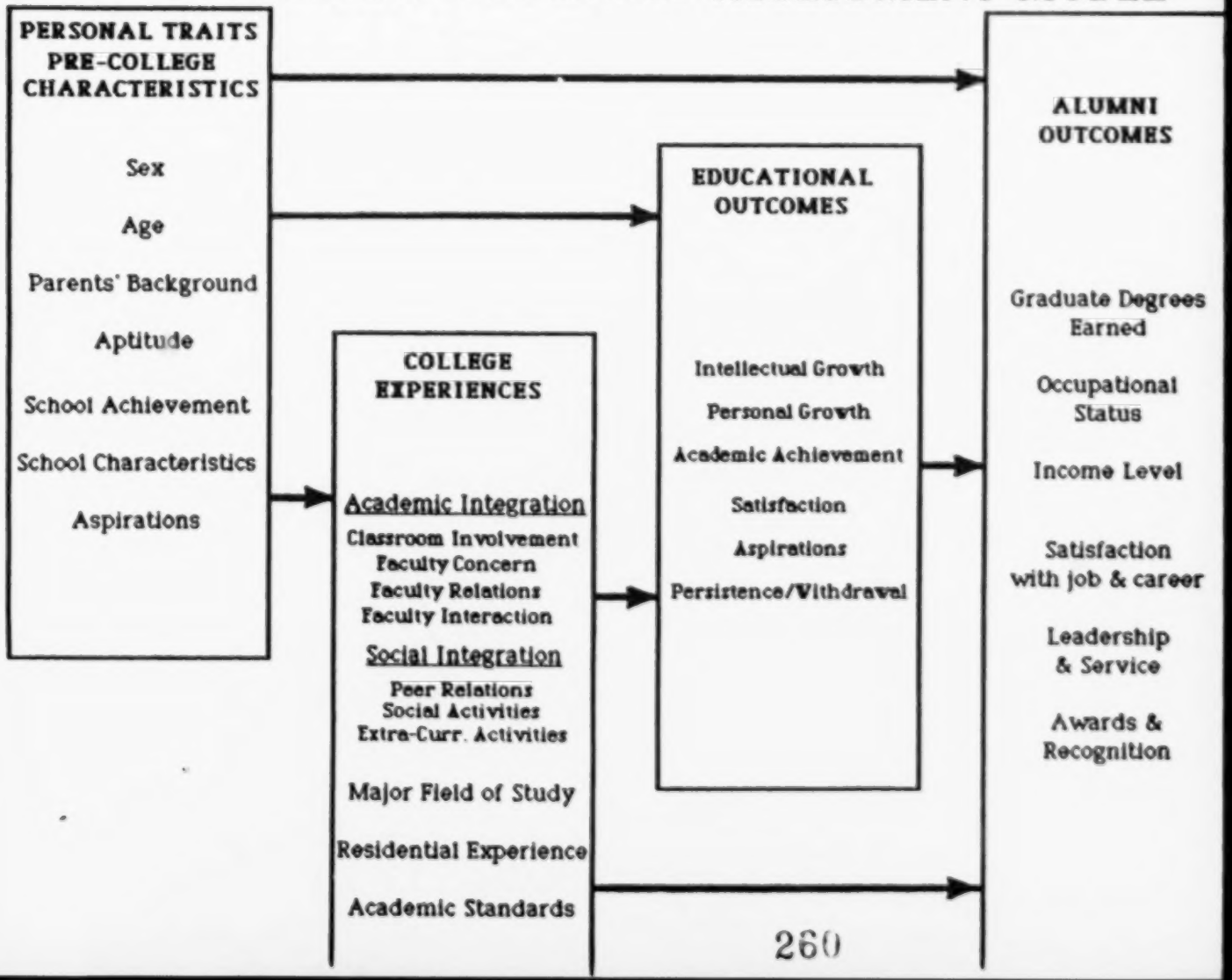
1969; Pace, 1979). Building especially on the theoretical contributions by Chickering (1969) and Tinto (1975), Terenzini and Pascarella and their associates have developed models which describe the contributions of pre-college characteristics, institutional characteristics, and campus experiences to the achievements and growth of various populations of students. (See Pascarella 1980, 1985; Smart and Pascarella 1986; and Terenzini et.al. 1984, 1985, 1986, 1987a, 1987b.)

Campus officials often find themselves in the position of wanting to know more about their transfer students. There are both educational and economic reasons for being interested in the intellectual growth and collegiate experiences of transfers. They constitute a significant population, because at most four-year campuses between one-quarter and one-third of the bachelor's degree recipients began their freshman year at some other institution. Research on transfer students has focused primarily on their academic performance and on the characteristics of transfer versus native students (Peng and Bailey, 1977; Phlegar, et.al., 1981).

Drawing upon these theoretical frameworks and longitudinal models, the University at Albany has developed a conceptual model, shown in Figure 1, which serves as a guide for campus assessment activities. The model has proven to have both practical and theoretical usefulness and is being used to guide our outcomes research. Thus far, the model has been tested only on populations of students who entered as freshmen, so the current study endeavors to test the utility of the model for a population of students who began their freshman year at some other institution. Moreover, another study (Volkwein, et.al. 1986) found significant differences between the transfers from two-year and four-year campuses, so this study is designed to test for similarities and differences between the two groups.

FIGURE 1

# ALBANY OUTCOMES ASSESSMENT MODEL



VARIABLES AND METHODS

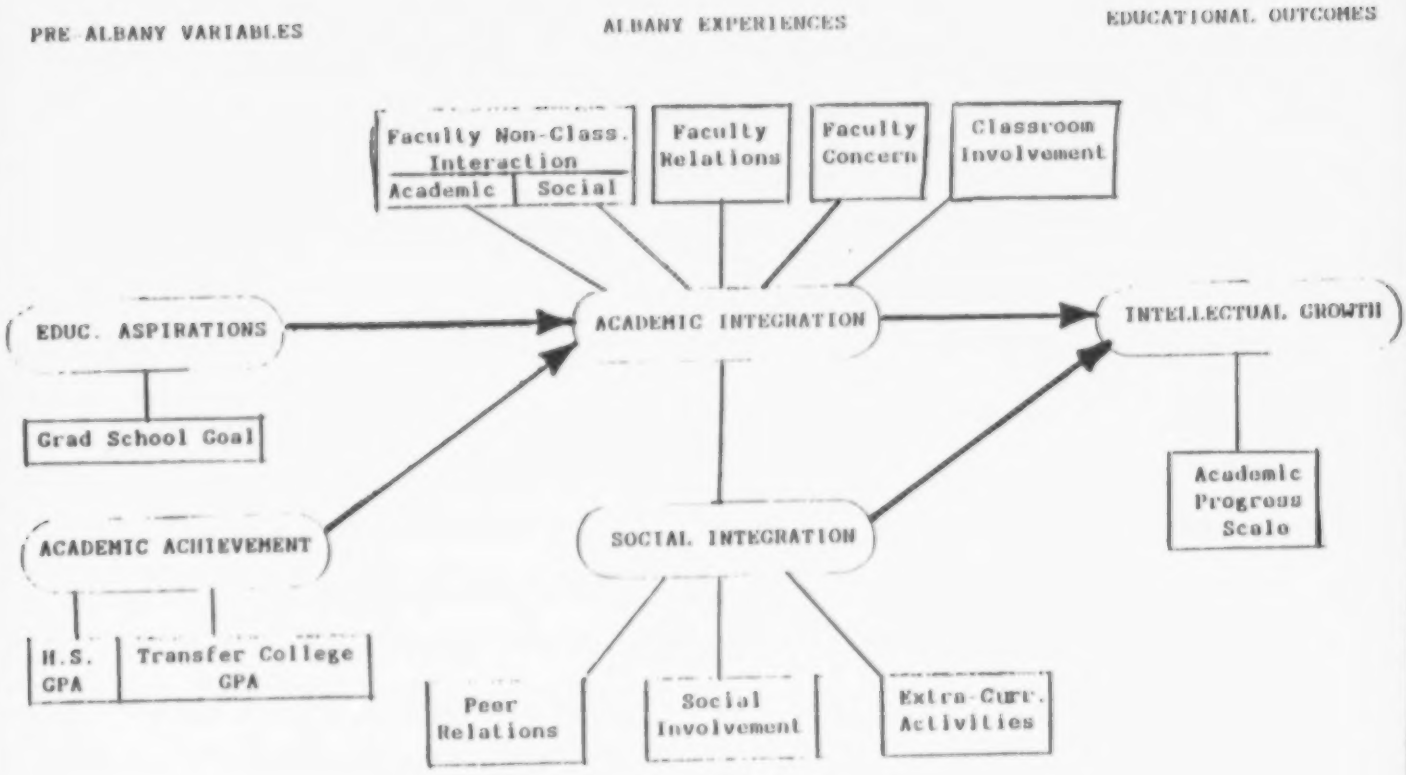
Figure 2 displays the causal model which guided this research. Consistent with the literature, it is expected that academic and social integration play important roles in shaping student development. Student backgrounds, especially their aspirations and previous achievement, contribute to their academic and social adjustments which in turn influence their intellectual growth. The ovals in Figure 2 represent the theoretical constructs being tested and the attached square boxes represent the empirical measures used in the analysis. The methodology parallels that used in several recent studies by Terenzini and Wright (1986, 1987a, 1987b). The specific population and instruments are described in Volkwein, et.al. (1986).

The study was longitudinal and ex post facto. Consistent with the conceptual framework, a survey instrument completed at new student orientation collected data about certain pre-college characteristics, and a second questionnaire administered after two semesters of study gathered information about their college experiences, and about their academic growth and development. A 52% response rate provided a rich array of information about 231 transfer students.

Students' pre-college characteristics were previous academic achievement (high school average and transfer college GPA) and educational aspirations (importance of graduate school). Preliminary analyses indicated that other background variables for which data were available (sex, age, ethnicity, combined SAT scores, and parents' education) were not reliably related to the dependent measure nor to other post-matriculation variables and were, consequently, excluded from the model. Within the causal model, academic and social integration levels are presumed to influence each other reciprocally, and to affect the amount of academic growth reported at the end of the year.

FIGURE 2

TRANSFER STUDENT MODEL OF INTELLECTUAL GROWTH



The concepts of student academic and social integration were measured using the scales employed in the earlier studies by Terenzini and Wright (1986, 1987a, 1987b). Academic integration consisted of five scales measuring student classroom involvement, student/faculty non-classroom interactions (both academic and social), faculty relations, and faculty concern for student development and teaching. Social integration was measured using three scales: peer relations, social involvement, and extra-curricular activities.

The criterion measure reflecting student intellectual growth is a scale of 8 items on which students reported their progress in developing skills such as gaining factual knowledge, learning and applying fundamental principles, critically evaluating ideas, being creative, and thinking analytically. The internal consistency (alpha) reliabilities for these various integration and growth scales range from .75 to .88.

Structural equation modeling serves as a useful approach for examining putative cause and effect variables. LISREL was employed to test for differences between the two-year and four-year groups in this causal structure. LISREL is a valuable computer tool designed to handle models with both directly observed and unmeasured latent variables, measurement errors, and reciprocal causation. It offers several advantages over the more common OLS path analytic techniques. The overall fit of the model was assessed by means of a large sample chi-square test.

The comparison of the causal structures for academic growth involved five stages. First, the causal relations specified by Tinto's model were translated into an initial measurement model using a confirmatory factor analytic technique. This measurement model treats academic and social

integration as "latent" (or unobservable) variables with multiple indicators. Second, a series of structural equations representing the hypothesized theoretical structure (see Figure 2) were incorporated into the measurement model for the two-year group. Third, specific hypotheses in the overall fit of the model were evaluated using both test of structural parameter estimates and a more global goodness-of-fit test. This process has been referred to as "model trimming." Fourth, once the best fitting model for the two-year group was determined, the structural parameters were fixed and the model was rerun using the correlation matrix of the four-year group. The overall Goodness-of-Fit test was used to indicate the degree to which the estimated causal model for the four-year group adequately reproduced the observed covariance structure of the two-year sample. Fifth, the best fitting models for each group were visually compared.

## RESULTS

Table 1 reports the means and standard deviations for all variables used in the analysis. The differences between the two groups are not great, but the two-year group exhibits consistently lower levels of high school achievement, academic integration, social integration, and intellectual growth than the group from four-year campuses. In contrast, the two year group displays slightly higher aspirations and earned a higher GPA at the previous institution.

Figures 3 and 4 summarize the LISREL results of the five step process for the two populations. The square boxes represent the observed variables, with the ovals connected to them representing the latent constructs. The values next to the lines connecting the boxes to the ovals are factor

TABLE 1
MEANS AND STANDARD DEVIATIONS FOR
TWO GROUPS OF TRANSFER STUDENTS

| | Means | | Standard Deviations | |
|---|---|---|---|---|
| Pre-Albany Variables | 2-yr | 4-yr | 2-yr | 4-yr |
| Aspirations - Grad School | 3.27 | 3.19 | .83 | .81 |
| Achievement - H.S. GPA | 83.50 * | 86.44 | 11.91 | 10.37 |
| -Transfer College GPA | 3.12 | 3.06 | .63 | .50 |
| Academic Integration | | | | |
| Stu/Fac Interaction - Academic | 1.67 | 1.79 | .91 | .95 |
| - Social | .90 | 1.11 | .94 | 1.02 |
| Faculty Relations | 2.72 * | 3.04 | 1.05 | 1.08 |
| Faculty Concern | 3.21 | 3.34 | .91 | .72 |
| Classroom Involvement | 2.79 * | 2.91 | .46 | .42 |
| Social Integration | | | | |
| Peer Relations | 3.48 | 3.67 | .99 | .94 |
| Social Involvement | 2.32 * | 2.54 | .71 | .71 |
| Extra-Curricular Activities | 1.32 | 1.46 | 1.32 | 1.27 |
| Intellectual Growth | | | | |
| (Academic Progress) | 3.13 | 3.20 | .57 | .44 |

* Difference between means
* Significant at the .05 level

loadings and reflect the relative contribution of each variable to the latent construct. For purposes of model identification, one parameter (the best indicator of the underlying construct) was set equal to 1.0. The internal consistency (alpha) reliability of the latent trait variables can be estimated by averaging the lambdas for the component variables.

Of greater interest are the numbers associated with the lines between and among the ovals. The ovals represent the theoretical model being tested, and the numbers associated with the connecting lines are the path coefficients, interpretable as standardized regression (beta) weights, reflecting the relative strength of influence.

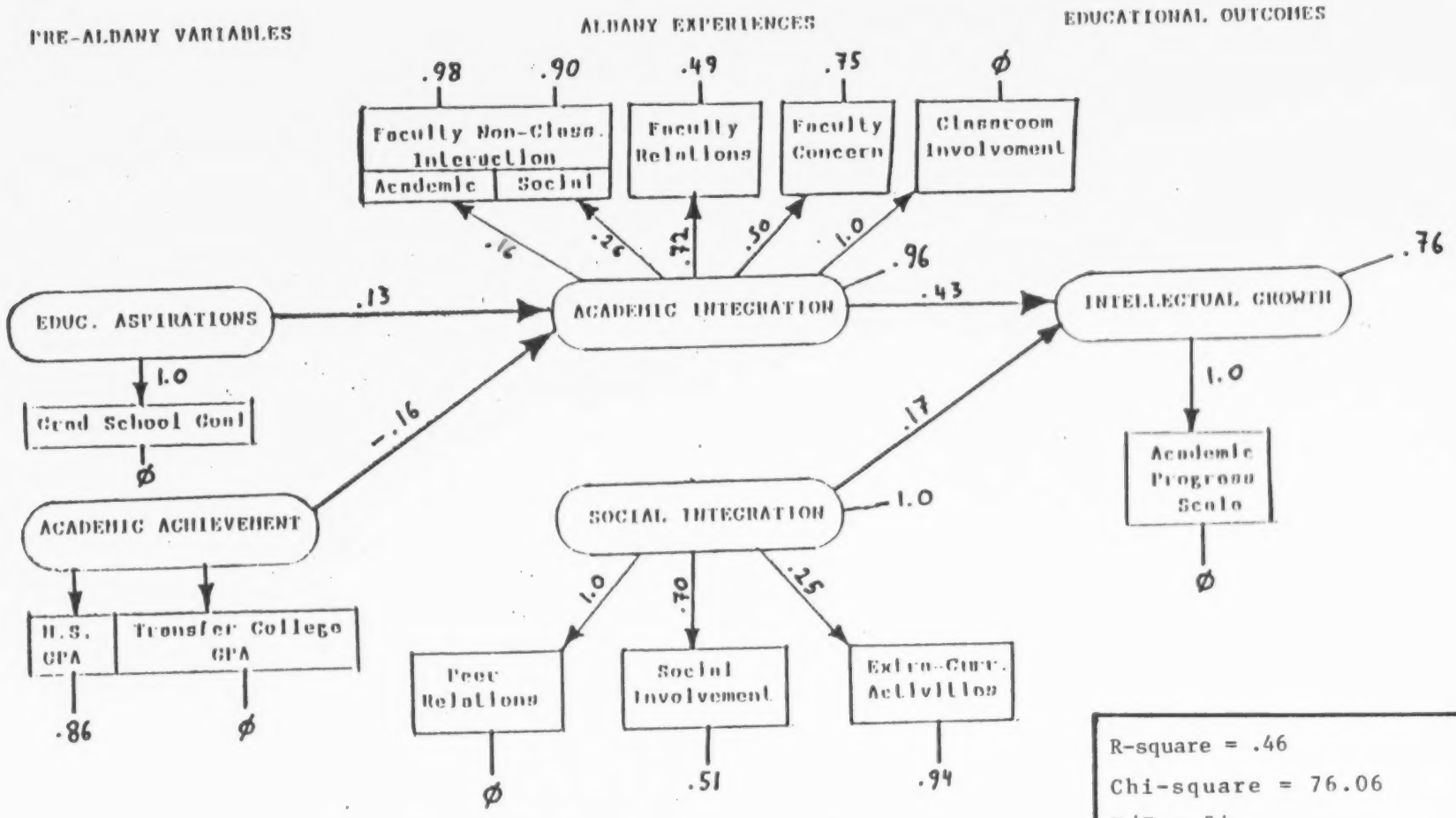
Overall, for the two-year group the initial structural equation produced an $R^2$ of .46, indicating that almost half of the variance in the two semesters of growth was explained by the model. Figure 3 shows the results of the LISREL analysis for the two-year group. The overall Goodness-of-Fit Index was .92, indicating a high degree of fit between the observed covariance matrix and that predicted by the structural model ($X^2$ = 76, d.f. = 54).

The path coefficients suggest that academic integration(.43) is more than twice as influential as social integration(.17) in explaining intellectual growth for this group. To some extent, student growth is a product of both clusters of variables, but growth is clearly and dominently an outcome of the academic variables for the two-year group. Background characteristics used in this study had, at best, a weak influence on their reported academic integration and no influence on social integration. (In fact, prior academic achievement is negatively associated with academic integration.) Moreover, there appeared to be no meaningful association between academic and social integration during the first year at Albany.

FIGURE 3

TRANSFER STUDENT MODEL OF INTELLECTUAL GROWTH

TWO-YEAR TRANSFERS




R-square = .46

Chi-square = 76.06

D/F = 54

Goodness of Fit Index = .92

267

268

For the four-year group, the initial structural equation accounts for 15% of the variance in reported growth. The LISREL model for the four-year group is shown in Figure 4, and the Goodness-of-Fit Index was a healthy .93 ($X^2$ = 44, d.f. = 55).

The influences of academic integration on four-year transfer student academic growth are substantial(.32), and four times as great as the effects of social integration(.08). As with the two year group, the pre-Albany variables are weakly associated with campus integration, and social integration appears to be largely independent of most other variables in the analysis.

Using a test which compares the LISREL results for the two groups, we found that three out of the four path coefficients are significantly different between Figures 3 and 4. The Beta weights connecting Educational Aspirations and Academic Integration are not significantly different for the two populations. However, the other Beta weights (connecting Academic Achievement/Academic Integration, Academic Integration/Intellectual Growth, and Social Integration/Intellectual Growth) exceed the 1.0 criterion for significance. Therefore, the strength of these influences is significantly more powerful for the two-year group.

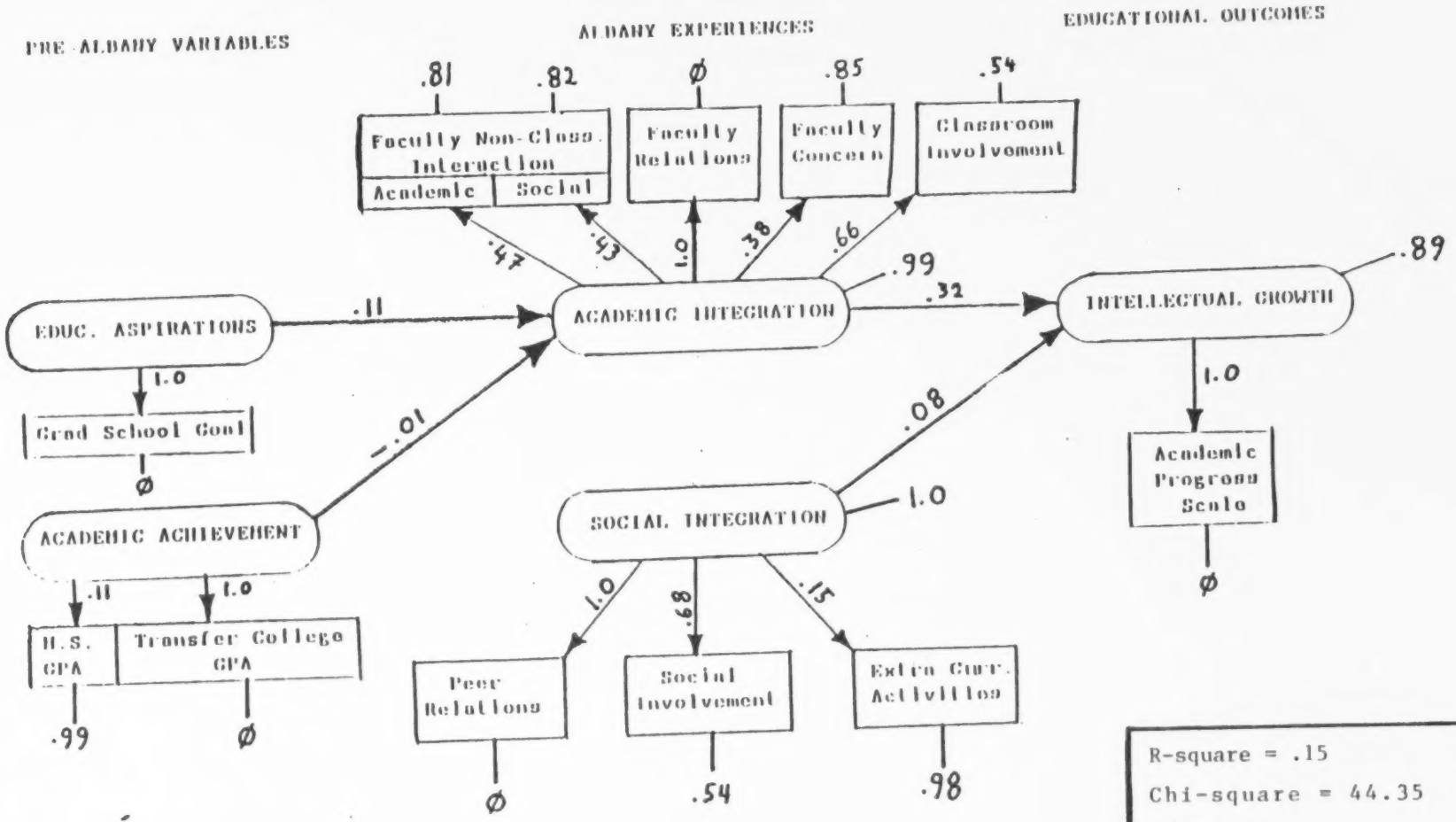
## DISCUSSION AND CONCLUSIONS

The analyses reported here suggest that transfer students from 2-year and 4-year colleges develop their academic skills at relatively similar rates during the first two semesters at Albany and that the sources of influence on that reported growth, while similar in certain respects, are different in others. Academic integration emerged as a critical variable in

FIGURE 4

TRANSFER STUDENT MODEL OF INTELLECTUAL GROWTH

FOUR-YEAR TRANSFERS




R-square = .15

Chi-square = 44.35

D/F = 55

Goodness of Fit Index = .93

the academic growth reported by both groups, but was significantly more powerful in the case of the two-year transfers. Social integration had a significantly weaker relationship to student growth, but it also was stronger among two-year transfers. While the pre-Albany variables had no direct relationship to student growth, their hypothesized indirect effects (through academic integration) were modest in the case of student aspirations and negative in the case of achievement. For both groups, the campus variables have more influence on student growth than personal traits and other pre-Albany experiences. Not only did the 4-year transfers report consistently more academic skill and academic integration, but they also appeared to experience higher levels of social integration than those from 2-year colleges. The two groups, therefore, differed in the strength of associations between student growth and the measures of their integration into the campus community.

The previous studies at Albany using populations of native freshmen suggested that the LISREL model might have some merit and this proved to be the case. We endeavored to test the external validity of the model using populations of transfer students and found modest support, but with some differences. The clusters of variables and the directions of influence held up largely as expected, even though the importance of the pre-Albany variables and the social integration measures are slight. Unlike the studies of native freshmen, the current analysis found no relationship between the measures of academic and social integration.

Similarly, the results of this study provide at least moderate support for the validity and utility of Tinto's (1975) model for the study of educational outcomes other than attrition. The weakness of the Tinto model in explaining these data would appear to be in its conception of the role of

social integration in students' academic development. Among the two-year group, social integration was not at all associated with academic integration and was only modestly related to growth. Among the four-year group, social integration was almost completely independent of both academic integration and reported growth. No evidence was found in this study to support the expected reciprocal relations between academic and social integration levels for either of the two groups.

It is unlikely that the results of this study can be due to inadequate measures. These instruments have been used in a number of other studies and shown to reliably represent the theoretical constructs. One might interprete these results to suggest that little basis exists for expecting students' social involvement to have any significant bearing on their academic growth. As noted earlier, however, there are both conceptual and empirical reasons for expecting a prominent role for social integration.

Alternatively, social integration may be an irrelevant, perhaps even negative, consideration in students' academic learning <u>during the first two years of college</u>. Indeed, in Terenzini and Wright's four-year study(1986,in press), social integration did not emerge as a salient influence until the junior year and, by the senior year, had as much influence on reported academic growth as did academic integration levels. The current results are congruent with the Terenzini and Wright study because 75% of the two-year transfers are juniors and 70% of the four-year transfers are lower-classmen. It may be that being a junior level transfer student, with an academic major and departmental affiliation, facilitates faculty/student interaction and provides an important means of enculturation into the University, both academically and socially.

From a practical standpoint, the results suggest that campus managers should introduce both groups of students to the academic systems of the institution. Academic integration levels were found to have strong and direct positive influences on transfer intellectual growth.

It is important to note that "academic integration" in this study is heavily influenced by students' contacts with, and reactions to, faculty members. The scales which load most heavily on academic integration are composed of items which reflect faculty receptiveness to students seeking help, faculty concerns about student growth, faculty who are interesting in teaching and who come to class well prepared. The clear implication is that student growth is enhanced when faculty members take their teaching and advisement responsibilities seriously and are accessible to students, both inside and outside the classroom. Meaningful student/faculty interchange, of course, may occur in a variety of settings ranging from after-class discussions to career advising, and institutions may have to take greater note of the faculty's influence in such settings and both facilitate and reward it. At the very least, the contents of the academic scales and the findings of this study suggest that institutions of higher education, if they wish to have an impact on student intellectual growth, need to give tangible encouragement to the instructional efforts of faculty.

By examining the factors contributing to the intellectual growth of two populations of transfer students, this study makes a contribution both to campus management and to an important theoretical model.

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# WHAT WILL YOU BE DOING IN 1992?: SPECULATION ON THE NEXT SET OF ISSUES AND THEIR EFFECT ON INSTITUTIONAL RESEARCH AND PLANNING OFFICES

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## ABSTRACT

Institutional research and planning offices, as parts of their parent institutions, are shaped by economic, demographic and social changes affecting the nation. A review of possible future changes suggests that those offices that focus on development, marketing, cost-effectiveness and assessment in the next five years will provide most help to their institutions, will prosper in budget and staff, but will lose independence; traditionally oriented offices may suffer cutbacks.

## OVERVIEW: CHANGES IN THE CONTEXT

Institutional research offices and planning offices have often sought a bit of distance from the fray in order to do their jobs well. Institutional research professionals want to analyze their information dispassionately, rather than being the captives of either academic or administrative advocates for particular causes. Planners are a bit less idealistic; they know that their job is to help make things happen. But they too recognize that they need to be alert to larger contexts than the momentary enthusiasms that grip a campus.

Yet both offices are subject to the movements that sweep over the industry. This paper attempts to identify some of the changes likely to shape higher education in the next half dozen years, and to suggest a few of the effects they may have on planning and institutional research offices.

The intent of the paper is to suggest the areas in which researchers and planners may be best able to make helpful contributions to their institutions, and thus to support the missions of those institutions. It can also be read as an attempt to identify those areas

in which the workers are likely to survive, vs. those in which they are likely to get cut; that is not its purpose, though that possibility may have the effect of causing people to read it more carefully.

The paper is intentionally labelled as a speculation. Was it Yogi Berra who said "Forecasting is always difficult, especially about the future."? The contents have been influenced by participation in agenda-setting discussions at the Association of Institutional Research and the Society for College and University Planning, by skimming the work of the saner futurologists, and by helping shape longer-range planning at my own institution. Nonetheless, the selection of trends and the conclusions are personal ones.

First, a look at the pendulum. Major swings seem to have come in fifteen-year cycles. The decades of the 1930's and the early 1940's were painful ones for higher education. The Great Depression had scarcely run its course when the Second World War hit. In contrast, the late 1940s and 1950s were a boom time, with the GI Bill, renewed prosperity, expansion of public higher education systems, and federal post-Sputnik support for science. By the mid-1960s, the tide had again reversed. The bloom was off the stock market, and colleges were hit by inflation and the oil crises. Waves of baby-boom kids came to colleges but tore them apart in the "free speech", civil rights, and anti-Viet-Nam movements. By the late 1970s, things began to look up. Colleges took advantage of the calm and the prosperity in the 1980s to restore order, fix up facilities, begin to catch up on faculty salaries, reexamine curricula, and rebuild balance sheets. Projected declines in enrollment due to changing college-age demography failed to materialize as larger fractions of the age group attended, and as some older students also enrolled. There was talk of constraint on tuition levels, but rising charges far outstripped inflation, providing incremental real income to deal with accumulated problems.

My projection, in a nutshell, is that in the 1990s we will look back at the 1980s as a golden decade.

My list of major national trends for the late 1980s and 1990s is given below. As with any such list, it would change significantly if there is a war or natural disaster.

The Economy:

- Inflation, fueled by continuing federal deficits, will begin to heat up in 1987 and 1988.

- The stock market, hit by terrible shocks in mid-October, 1987, will oscillate for a while, then fall off substantially, presaging a slow recession with fears of depression.

- The federal government will be forced to deal more severely with the budget deficits, by increasing taxes and reducing expenditures. While a major part of the reduction in expenditures will come from the defense area, other programs such as student aid and R&D support will also suffer.

- The falling stock market, declining economy, and increasing taxes will cut philanthropic giving.

- International competitiveness will strengthen as an issue.

Demography:

- The pool of high school graduates will tail off sharply in the late 1980s and early 1990s, more of course in some regions than others. There will be no offsetting increase in the percentage of the graduates going on to college, except in the community college sector, which is slightly counter-cyclical.

- Colleges will slowly awake to the fact that the next generation of students come disproportionately from different ethnic, racial, and geographic backgrounds, has less ability to pay, and is less well prepared.

- The numbers of students entering professional schools (especially the health professions) will continue to decline. The percentage entering graduate programs will begin to increase as the future need for teachers begins to become evident and as some further graduate student support becomes available. Teacher education will be one of the few growth areas.

- Dichotomies masked by prosperity will become clearer. A limited number of prestigious high-cost institutions will continue to have long waiting lists, but many less well known schools will see falling enrollments. The job market will offer a limited number of technologically and managerially oriented positions on the one hand, and a myriad of service jobs not requiring higher education on the other.

Between institutions:

- There will be increasing competition and friction between independent and public institutions for limited state support and student populations. The difference between FASB and GASB accounting procedures for depreciation of plant and equipment will aggravate the pricing differential.

- There will be increasing restiveness in the system. Individual institutions (both public and private) will want more entrepreneurial authority; state coordinating boards will feel a pressing obligation to rationalize the system through program closures and control of any new ventures.

Within institutions:

- The uncapping of retirement, especially in an inflationary and economically depressed time, will result in a large fraction of faculty and staff members continuing their employment, at least on a part-time basis. There will, for a while, be an aging professoriat, with few positions to fill. Academic leaders will become much more concerned about filling the anticipated flood of openings in the late 1990s.

- Ironically, it will be hard to recruit qualified faculty. Institutions at both the high school and post-secondary level that now see shortages of qualified teachers in specific areas will find it difficult to recruit faculty generally.

- Financial stringencies will show up in both cutbacks in staff and aggressive searches for additional revenue sources.

- Faculty and staff members, feeling the economic pinch, will revive the unionization movement.

- Institutions will seek added ties with industry, perhaps with state and federal support.

- Facilities, especially those built in the boom era of the 1950s, will begin to deteriorate more rapidly and need massive reconstruction and modernization.

- The pressure for accountability will continue and assessment procedures will become routinized. There will be enhanced attention to value-added measurements and to assessment of programs, students, and institutions, as administrators and faculty are held more accountable.

- The rapid progress in information technology will continue unabated, and our dependence on it will grow rapidly. There will be continuing decentralization of institutional data access, with strengthened central controls.

This is a pretty gloomy list. There are, however, some positives:

- Colleges and universities will, by and large, enter the decade in better financial shape and better managed than they had been fifteen years earlier. Academic standards have been raised and curricula strengthened in at least some areas; research activities are vigorous; salaries have been somewhat raised; physical plants are in better (if not yet good) condition; and corporate and alumni relationships have been strengthened.

- The increased level of market sensitivity and student recruiting skill will help many institutions adapt to change quickly enough to offset severe negative effects.

How will these changes affect institutional research and planning offices? The first answer is that the questions these offices deal with will shift, as colleges and universities try to cope with the new pressures. Table 1 outlines the areas these offices have traditionally dealt with and those they are likely to be asked increasingly to consider. Since institutions vary, and since certain issues affect some segments more than

MAJOR INSTITUTIONAL RESEARCH AND PLANNING ISSUE AREAS, BY INSTITUTIONAL TYPE AND CONTROL
WITH ESTIMATE OF GROWTH OR DECLINE IN IMPORTANCE IN THE NEXT FEW YEARS

| Issue area | Institutional Type: Rsch. | Doct. | Lib. Arts | Two-Year | Control: Pub. | Priv. | Importance: Base | Growth |
|---|---|---|---|---|---|---|---|---|
| ENROLLMENT ISSUES: | | | | | | | | |
| Student recruiting and retention: | | | | | | | | |
| · traditional undergraduates | | * | * | | * | * | *** | *** |
| · minority students | * | * | * | * | | * | * | ** |
| · international students | * | * | * | | | * | * | ** |
| · graduate students | * | * | | | * | * | | *** |
| · professional students (esp. health) | * | | | | * | * | | *** |
| Financial aid: effects of differential packaging on recruitment and retention; of debt burdens | * | * | * | | | * | * | *** |
| ACADEMIC PROGRAM ISSUES: | | | | | | | | |
| Assessment: outcomes research, curric. evaluation | | | | | | | | |
| · traditional students | * | * | * | * | * | * | ** | ** |
| · minority students | | * | * | * | * | * | * | ** |
| · remedial programs | | * | * | * | * | | * | * |
| · adult education | | * | | * | * | * | * | * |
| · graduate education | * | * | | | * | * | * | ** |
| · professional education | * | | | | * | * | * | ** |
| · international programs and students | * | * | * | | * | * | * | ** |
| Basic educational research: how students learn | | * | * | | * | * | * | * |
| Instructional support: | | | | | | | | |
| · Instructional technology: how used, effectiveness, costs of dev. & use | * | * | * | | * | * | * | * |
| · Information access: libraries, data bases) evaluation, utilization, costs | * | * | * | * | * | * | * | ** |
| · Academic computing: impact, costs | * | * | * | * | * | * | * | ** |
| Faculty flow: effects of uncapping; design and of retirement plans; recruiting and retention | | | | | | | | |
| · replacement traditional faculty | * | * | * | | * | * | ** | *** |
| · minority faculty | * | * | * | * | * | * | * | * |
| Non-academic aspects of campus life: evaluation, impact, costs | | * | * | | | * | * | * |
| Research: measures of productivity, involvement, full costs | * | * | | | * | * | * | ** |
| Program discontinuance and retrenchment: what information needed? what is IR role? | * | * | * | | * | * | * | *** |

| Issue area | Institutional Type: Rsch. | Doct. | Lib. Arts | Two-Year | Control: Pub. | Priv. | Importance: Base | Growth |
|---|---|---|---|---|---|---|---|---|
| FACILITY ISSUES: | | | | | | | | |
| Plant repair and renovation: needs inventory; impact on learning and on student & faculty recruitment | * | * | * | | * | * | * | *** |
| · national data collection | * | * | | | * | * | * | * |
| Equipment replacement and upgrading: needs inventory; impact on learning and on student and faculty recruitment | * | * | * | | * | * | * | ** |
| RESOURCE ISSUES: | | | | | | | | |
| Fund-raising: evaluation of potential, techniques, cost-effectiveness | * | * | * | | * | * | * | *** |
| Inst. advancement: eval. of publications, image | * | * | * | * | * | * | * | * |
| Alumni research: activities, views, involvement | * | * | * | * | | * | * | ** |
| Corporate relationships: evaluation, effects | * | * | | | * | * | * | ** |
| MANAGEMENT ISSUES: | | | | | | | | |
| Cost-effectiveness: evaluation of utilization, costs, impact, output of each function, using trend analyses and comparative studies | | | | | | | | |
| · academic programs | * | * | | * | * | * | ** | *** |
| · academic support activities | * | * | * | | * | * | * | *** |
| · student services | | * | * | * | * | * | * | * |
| · administrative functions | * | * | * | * | * | * | * | ** |
| · auxiliary enterprises | | * | * | | | * | * | ** |
| · organized activities | * | * | | | | * | * | * |
| Strategic planning: more longitudinal and comparative analysis, environmental scanning | * | * | * | * | * | * | ** | ** |
| Facility and program justification: | * | * | * | | * | * | * | ** |
| Salary and fringes: assessment of competitiveness, alternatives; eval. of cafeteria plans | * | * | * | | * | * | * | ** |
| Human resources: eval. of turnover, satisfaction training effectiveness, promotion patterns | * | * | * | | * | * | * | *** |
| Communities: impact studies, image | | * | * | * | | * | * | * |

| Issue area | -- Institutional Type -- Rsch. | Doct. | Lib. Arts | Two-Year | --Control-- Pub. | Priv. | -Importance- Base | Growth |
|---|---|---|---|---|---|---|---|---|
| PROFESSIONAL ISSUES FOR INSTITUTIONAL RESEARCH | | | | | | | | |
| Data-administration: role, function | | * | * | * | * | * | ** | ** |
| Report preparation for outside agencies: how to make something useful of these | | * | * | * | * | * | * | * |
| Technology: relation with chief info. officer (if any) | | | | | | | | |
| · role in training other administrators | | | * | * | * | * | * | * |
| · role as advocate | | * | * | * | * | | * | * |
| Strengthening of IR · planning · admin. links Nationally, links between associations | | * | * | * | * | * | ** | *** |
| Career paths: changing? closer to management, finance | | * | * | * | * | * | * | ** |
| OTHER ISSUES: | | | | | | | | |
| Athletics: academic performance, support | * | * | | | * | * | * | * |

others, the table indicates for each item which segments of higher education are likely to be most affected. Finally, the table reflects with one, two, or three asterisks, a speculative identification of the issues that are likely to grow in importance in the next several years.

The "three-star" issues are the following:

- Recruiting and retention of traditional undergraduates, graduate and professional school students;
- Evaluation of financial aid amounts and packaging and debt burdens on student recruitment and retention;
- Dealing with faculty aging, retirement and recruitment of replacements;
- Program discontinuance and retrenchment: information needs
- Plant repair and renovation: needs inventories, effects
- Evaluation of fund-raising
- Cost-effectiveness of academic programs and academic services
- Human resources: evaluation of turnover, satisfaction, training, etc.
- Strengthening of relationships between IR, planning and other managerial functions.

The next area in which one would look for impact of the changing environment is on the resources that institutional research and planning offices have to work with, and where they report in the organization. I will venture one overall guess: these offices face a tradeoff between impartiality and distance on the one hand, and involvement and advocacy on the other. My general hypothesis is that those institutional research and planning offices that focus on institutionally critical issues of marketing, development, cost control and assessment will prosper in budget and staff, but will lose some of their professional "distance" as they become involved in managerial issues. In the process, they may risk loss of separate identity and become parts of newly-formed managerial teams. On the other hand, traditionally oriented institutional research and planning offices will face severe cutbacks in budget and staff.

There is an alternative route that a few institutional research offices may take: a deep involvement in educational research. An improved understanding of how students learn, the careful evaluation of the impacts of altered curricula and of educational technology, a sensitive assessment of the "value added" in the educational process and how

to maximize it – all of these will remain of cardinal importance. Practitioners in these fields will likely gravitate to the offices of deans and provosts rather than to those of financial and executive officers. Their funding may have to come in substantial part from external sources.

In my view, these changes in the environment and in our institutions should be viewed as opportunities rather than as threats. They do pose problems for those of us who want to keep a little distance, who want to do our research with the focus we think it should have. Yet there are a multitude of questions that can be researched, and of projects that can be planned. If we are serious about having an impact on our institutions and on higher education as a whole, we need to be where the action is; we need to have our research and planning agendas shaped by real questions, and have our findings shape real policies and actions. In a difficult decade, which I think we have before us, institutional research can become indispensable to our institutions if it is linked to action, or, if not, it can become clearly dispensable.

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